M 47/draft

Proposed Mining and Reclamation Plan, Meeker Area Mines, Rio Blanco County, Colorado

Draft
Environmental Impact Statement
OSM-EIS 7

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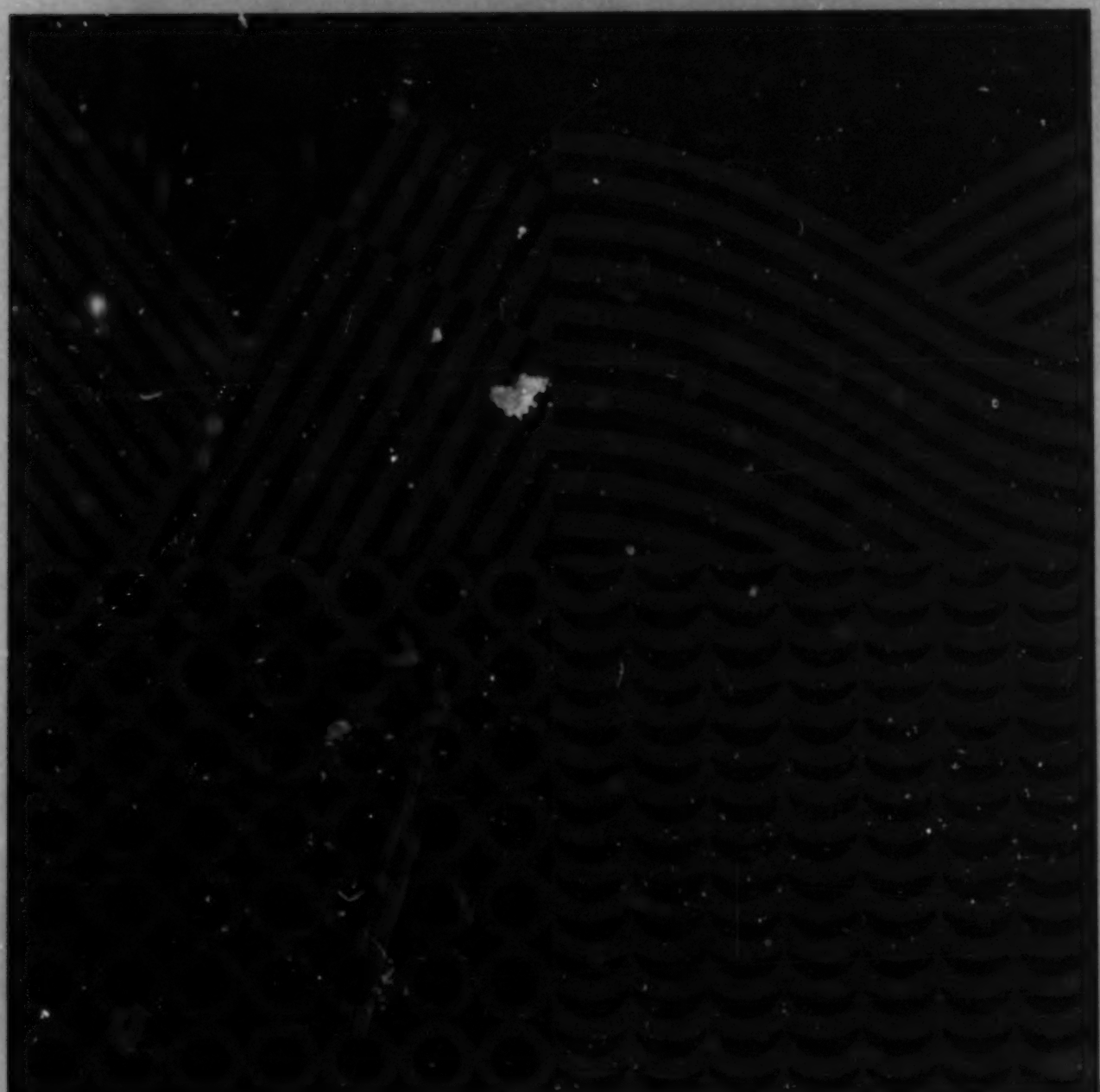

U.S. Department of the Interior
Office of Surface Mining Reclamation and Enforcement

Proposed Mining and Reclamation Plan, Meeker Area Mines, Rio Blanco County, Colorado

Draft Environmental Impact Statement
OSM-EIS-7

October 1982

Type of Action: Administrative

Prepared by the
U.S. Office of Surface Mining Reclamation and Enforcement
in cooperation with the
Bureau of Land Management

James R. Harris

Director

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COVER SHEET

Lead Agency:
Office of Surface Mining Reclamation and Enforcement (OSM)

Cooperating Agency:
Bureau of Land Management (BLM)

Type of Action: Administrative

For Further Information, Contact:
Mr. Allen Klein, Administrator
Attn: MKREIS
Office of Surface Mining, Western Technical Center
Brooks Towers
1020 -15th Street
Denver, Colorado 80202
(303) 837-5421 (commercial)
327-5421 (FTS)

Type of Statement: Draft Environmental Impact Statement (EIS)

Abstract:

On June 13, 1980, Northern Coal Company (NCC) submitted a mining and reclamation plan (MRP) to OSM and the Colorado State Mined Land Reclamation Division (CMLRD). In this MRP, NCC proposes to underground mine approximately 83,270,000 tons of coal over a 29-year period at the Meeker area mines in Rio Blanco County, Colorado. Specifically. NCC proposes mining of new Federal coal from an existing underground mine, mining of additional Federal and private (fee) coal from another existing underground mine. creation of two other underground mines for mining new Federal and private (fee) coal, and construction of ancillary surface facilities, haul roads, and one rail loadout. The Meeker area mines study area encompasses about 4,750 acres of land discussed in the MRP consisting of five Federal coal leases, one private (fee) coal lease, and one preference right lease application (PRLA). In addition, NCC proposes to underground mine coal in two additional land areas not discussed in the MRP if it is successful in obtaining the leases. For purposes of impact analyses, these lands are considered in the draft EIS to be part of the Meeker area mines study area and include one PRLA, of about 3,567 acres of land, and approximately 600 acres of unleased land, both located west of the MRP land area. This land area could increase recoverable coal by an estimated 106,338,000 tons and extend the mine life by approximately 30 years. Proposed Federal actions would involve three separate decisions to be made under applicable Federal laws. The first action would be a decision by the Secretary of the Interior on NCC's MRP. The second action would be a decision by the Secretary on the competitive leasing of the 600 acres of unleased land. The third action would be a decision by the BLM Colorado State Director on the noncompetitive leasing of NCC's PRLA's. The draft EIS indicates that significant impacts would occur on socioeconomic conditions and wildlife if the proposed action is approved and implemented.

Date By Which Comments Must Be Received: December 1 1982

Please retain your copy of this draft EIS. If changes in response to comments are minor only the comments the responses. and an errata sheet will be circulated to previous recipients of the draft EIS. The comments, responses, and errata sheet, when attached to the draft, would constitute the final EIS. Copies of the final EIS will be sent only to those agencies and organizations listed in chapter **6,** to those who comment on this draft EIS, and to those who specifically request a copy of the final EIS.

SUMMARY

Introduction

This draft environmental impact statement (EIS) discusses Northern Coal Company's (NCC's) proposal to underground mine coal at the Meeker area mines. Rio Blanco County, Colorado. In addition. the draft EIS discusses the environmental impacts that would most likely result from approval and implementation of the proposed actions (see chapters 2 and 4) and mitigation measures to be required of NCC by the various agencies to bring these proposed actions, if approved. into compliance with applicable Federal, State, and local laws (see chapter 4). The lead agency for the draft EIS is the Office of Surface Mining Reclamation and Enforcement (OSM). The U.S. Bureau of Land Management (BLM) is a cooperating agency. The draft EIS was prepared for OSM by an interdisciplinary team of consultants. (See chapter 5.)

Please note that the following draft EIS is not the technical analysis document. The technical analysis was prepared by the State of Colorado and OSM and is a detailed technical and environmental analysis of NCC's mining and reclamation plan (MRP). This, and supporting material, is available for inspection at the OSM, Western Technical Center, office.

Applicant's Proposal

NCC proposes to mine approximately 83,270,000 tons of coal over a 29-year period from two existing underground mines and two new underground mines. In addition, it proposes construction of ancillary surface facilities, haul roads, and one rail loadout. However, in November 1981, NCC indicated to OSM that engineering design and subsequent permit acquisition for the two new underground mines, their ancillary surface facilities, and the rail loadout were being postponed due to reconsideration of their development plans. (See chapter 1.) Nevertheless, the potential impacts from the proposed development of the two new mines, their ancillary surface facilities, and the rail loadout are considered in this draft EIS. In addition this EIS looks at an additional 3,567-acre PRLA and about 600 acres of unleased land located west of the MRP area. This land could increase the amount of recoverable coal by about 106,338,000 tons and extend the life of the mines by about 30 years. The affected Meeker area mines study area encompasses about 8,917 acres of land and includes five Federal leases, one private (fee) coal lease, two preference right lease applications (PRLA's), and approximately 600 acres of unleased land.

Need For Federal Decisions

On June 13, 1980, NCC submitted to OSM and the Colorado State Mined Land Reclamation Division (CMLRD) a MRP for the proposed underground mining of coal on about 4,750 acres of land consisting of five Federal coal leases, one private (fee) coal lease, and one PRLA. In addition, BLM proposes to lease two additional land areas that would be mined by underground methods adjacent to the current mining leases being discussed. These were not discussed in the MRP. For purposes of impact analyses, these lands are considered in the draft EIS to be part of the Meeker area mines study area and include one PRLA, of about 3,567 acres of land, and approximately 600 acres of unleased land, both located west of the MRP land area. Proposed Federal actions would involve three separate decisions to be made

under applicable Federal laws. The first action would be a decision by the Secretary on NCC's MRP. The second action would be a decision by the Secretary on the competitive leasing of the 600 acres of unleased land. The third action would be a decision by the BLM Colorado State Director on the noncompetitive leasing of NCC's PRLA's. The three separate actions are independent of one another and the approval and/or disapproval of one would not alter the decision process for the others. (See chapters 1 and 2.)

Issues and Areas of Concern

To ensure that concerns of other government agencies and the public were considered in the draft EIS, a scoping hearing was held in Meeker, Colorado, on April 15, 1981. At this hearing, agencies and the public were given the opportunity to express opinions on issues and areas of concern regarding NCC's proposal. Transcripts of this hearing are available from OSM's office in Denver.

Several issues and areas of concern were identified at the scoping hearing. These are addressed in the draft EIS and include the following:

- Impacts on hydrology.
- Impacts on wildlife, particularly in regards to potential increase of wildlife roadkills from increased vehicle traffic.
- Impacts on socioeconomic conditions, particularly in regards to demands from increasing population on existing community facilities and services, i.e., housing and schools.
- Impacts on transportation and safety.
- Impacts on energy consumption.
- Impacts on recreation.

General Conclusions

As a whole, the environmental impacts projected to occur if the proposed action is approved and implemented tend to be insignificant when compared against present and possible future coal mining in Rio Blanco, Moffat, and Routt counties. However, the impacts become more significant when measured against local conditions. Thus, the significance of the impacts depends in large part on the above perspectives. The following is a brief summary of those impacts.

Topography

Mining would be done by underground room-and-pillar methods thereby having only a minimal impact on local surface topography. Some localized ground subsidence is likely, but should not have a significant effect on the topography of the area. Mining wastes would be deposited at a refuse disposal site that would lend itself to future regrading to a configuration that would blend in with the existing adjacent topography.

Geology

Mining would result in the removal of limited quantities of overburden and waste rock material. Changes to the study area's geologic features would be localized to those overlying strata areas impacted by subsidence. A total of about 189 million tons of coal could be mined during the period of mining.

Soils

Mining would result in removal and stockpiling of topsoil materials thereby modifying local soil characteristics in the estimated 140 disturbed acres. However, changes in soil productivity are expected to be minimal following reclamation of the disturbed areas. Some loss of topsoil material during the period of mining would be unavoidable due to erosion.

Surface-Water Hydrology

Although comprehensive surface-water quantity and quality data are not available, enough data are available to make a determination of projected impacts. Mining of coal under Curtis Creek may deplete up to 9,000 gallons per day, or about 20 percent of the 1979 summer base flow for the creek. This is a maximum estimate; the actual depletion value is expected to be much less. Some of the water loss would be temporary, but other losses must be regarded as permanent. A slight degradation of surface-water quality is anticipated as the result of mine dewatering operations, but the magnitude of this impact is expected to be minor.

Ground-Water Hydrology

Ground-water usage in the study area is limited. The only significant aquifer is located 500 feet below the lowest coal seam proposed to be mined, and it appears to be hydraulically isolated from the ground water in the coal-bearing formations. Some lowering of the water table above the seams being mined is expected to occur, particularly during the period of mining. There are 17 registered wells in the general vicinity and, according to their location, depth, relative pumping rate and stratigraphic location, none appear to be in an area that would be affected by drawdown from the mining operation. The effects of this drawdown are expected to be localized and minor. Some slight, localized ground-water quality degradation would be likely, but its effects should not reach the levels of the deep aquifer.

Alluvial Valley Floors

Subsidence, if it were to occur, could cause minor effects on the subirrigated area of the FF tributary alluvial valley floor by draining the alluvial aquifer or by lowering the shallow water table. It could lead to a small, but currently unquantifiable, reduction in surface-water flow to the lower Aichers Draw alluvial valley floor by the possible interception of water.

Air Quality

Insignificant increases in fugitive dust and air pollutant emissions would result from mining and associated vehicle traffic.

Vegetation and Land Use

Mining activities would result in minor losses of haylands, grazing lands and wildlife habitat during the period of mining and reclamation.

Wildlife

Roadkills of wildlife may increase from more vehicles in the area. Critical winter range for big game would be reduced because of land development for mining. Any reduction in critical winter range is considered a significant impact. Wildlife would also be displaced from portions of existing migration routes.

Socioeconomics

By 1992 the Meeker area mines would contribute about 1,436 people to the population of Meeker and Rio Blanco County. This represents 13 percent and 7 percent, respectively, of the total population growth projected for the area as a result of oil shale and other energy development, and is considered a significant impact. Direct and indirect employment from the mines would provide benefits, including increased personal income, retail sales, and assessed valuation in a region that is subject to a fluctuating economy due to energy market uncertainties. The mine-related population would create increased demands for housing, public services, and facilities and would cause some budget shortfalls in the initial years of the project.

Transportation

The potential for traffic congestion, road maintenance, and accidents would increase from more vehicles in the area.

Recreation

Use of indoor and outdoor recreation facilities would increase as a result of population increases.

Cultural Resources

Increased population in the study area and increased usage and accessibility of existing cultural resource sites would most likely lead to impacts from vandalism and unauthorized collection of artifacts.

Esthetics

Mining and ancillary surface facilities would add visual intrusions to observers passing near the area on State Highway 13/789 during construction and the period of mining. Following reclamation, these intrusions would be virtually eliminated as vegetation becomes reestablished.

Noise

Increases in the existing noise environment would result from mining and higher numbers of vehicles in the area.

CONTENTS

	Page
Cover sheet	iii
Summary	v
Chapter 1. Purpose and need for action	1-1
Introduction	1-1
Proposed Federal actions	1-1
Need for Federal decisions	1-3
Chapter 2. Alternatives including the proposed action	2-1
Introduction	2-1
Alternative A--Preferred alternative	2-3
Applicant's proposal	2-3
Planning and environmental controls	2-5
Alternative B	2-17
Alternative C	2-17
Alternative D	2-18
Chapter 3. Description of the affected environment	3-1
Topography	3-1
Geology	3-1
Soils	3-7
Surface-water hydrology	3-10
Ground-water hydrology	3-13
Alluvial valley floors	3-14
Climate	3-15
Air quality	3-16
Vegetation	3-17
Land use	3-22
Wildlife	3-23
Socioeconomics	3-31
Transportation	3-35
Recreation	3-36
Cultural resources	3-36
Esthetics	3-40
Noise	3-40
Chapter 4. Environmental consequences	4-1
Introduction	4-1
Topography	4-1
Geology	4-2
Soils	4-2
Hydrology	4-3
Alluvial valley floors	4-7
Air quality	4-8
Vegetation	4-8

CONTENTS

	Page
Chapter 4. Environmental consequences--Continued	
Land use	4-11
Wildlife	4-11
Socioeconomics	4-13
Transportation	4-21
Energy requirements	4-22
Recreation	4-23
Cultural resources	4-23
Esthetics	4-24
Noise	4-24
Blasting	4-26
Unavoidable adverse environmental effects	4-26
Irreversible and irretrievable commitment of resources	4-29
Chapter 5. Preparers and reviewers	5-1
Chapter 6. Consultation and coordination	6-1
Chapter 7. Selected references	7-1
Appendix A. Applicant's proposal	A-1
Mining	A-1
Topsoil protection	A-9
Backfilling and grading	A-11
Revegetation	A-12
Air resources protection	A-16
Appendix B. The Federal Coal Management Program	B-1
Appendix C. Unsuitability criteria	C-1

ILLUSTRATIONS

		Page
Figure 1-1.	Location map, Meeker area mines.	1-2
2-1.	Land classifications, Meeker area mines.	2-2
3-1.	Surface geology, Meeker area mines.	3-2
3-2.	Geologic sections through Northern Nos. 1, 2, and 3, and Rienau No. 2 mines. Sections A-A' and B-B'.	3-4

CONTENTS

		Page
Figure 3-3.	Geologic section through Northern Nos. 1, 2, and 3, and Rienau No. 2 mines. Section C-C'.	3-5
3-4.	Generalized stratigraphic column of coal seams proposed for mining.	3-6
3-5.	Soil associations within the MRP land area.	3-8
3-6.	Soil associations for PRLA C-0126997 and unleased land.	3-9
3-7.	Surface- and ground-water monitoring stations within the MRP land area.	3-11
3-8.	Vegetation for lands in the MRP.	3-19
3-9.	Vegetation communities within PRLA C-0126997 and 600 acres of unleased land.	3-20
3-10.	Eagle nest buffer zones within and around PRLA C-0126997 and unleased land area.	3-26
3-11.	Deer and elk summer/winter range and migration routes.	3-29
3-12.	Cultural resource inventory status.	3-37
4-1.	Projected Curtis Creek flow and water quality during mining, downstream from operations.	4-5
A-1.	Northern No.1 mine. FF coal seam, life-of-mine sequence.	A-2
A-2.	Northern No. 2 mine. Upper P and P coal seams, life-of-mine sequence.	A-3
A-3.	Northern No. 3 mine. J coal seam, life-of-mine sequence.	A-4
A-4.	Rienau No. 2 mine. G coal seam, life-of-mine sequence.	A-5
A-5.	Northern No. 1 mine surface facilities and refuse disposal area.	A-8
A-6.	Northern Nos. 2 and 3 mines, Rienau No. 2 mine, surface facilities (follows page number shown).	A-8
C-1.	Suitable/unsuitable lands for coal development.	C-2

CONTENTS

TABLES

			Page
Table	2-1.	Mine acreage data	2-3
	3-1.	Full suite water quality parameters.	3-12
	3-2.	Air quality standards for TSP.	3-17
	3-3.	TSP data for No. 1 North Hi-Vol and No. 2 South Hi-Vol stations.	3-17
	3-4.	Acreage for vegetation community types on the proposed MRP land and affected areas.	3-18
	3-5.	Summary of cover density, production, and diversity values for affected vegetation communities.	3-21
	3-6.	Productivity of land within MRP land area, 1979 data.	3-22
	3-7.	Threatened or endangered species of wildlife known to inhabit northwestern Colorado.	3-24
	3-8.	Economically valuable species of wildlife observed within the MRP land and proposed Milk Creek rail loadout areas.	3-27
	3-9.	Colorado West Area Council of Governments Scenario II population projections.	3-32
	3-10.	MRP sites.	3-38
	3-11.	Sites in the proposed Milk Creek rail loadout area.	3-38
	3-12.	PRLA C-0126997 sites.	3-39
	3-13.	PRLA C-0126999 sites.	3-39
	4-1.	Estimated controlled TSP emissions for maximum production.	4-9
	4-2.	Acreage and productivity of land within MRP land area, 1979 data.	4-10
	4-3.	Demographic variables with and without the Meeker area mines.	4-14

CONTENTS

		Page
Table 4-4.	Socioeconomic assessment. key assumptions.	4-15
4-5.	Summary of countywide capital improvements program in Rio Blanco County.	4-18
4-6.	Net fiscal impact of NCC mine expansion on Rio Blanco County, town of Meeker, RE-1 School District.	4-19
4-7.	Summary of radial distances of L_{eq}=55 dB(A) noise contours under existing and peak production conditions (neglecting barriers).	4-25
A-1.	Coal production.	A-6
A-2.	Soil toxonomic classification.	A-9
A-3.	Seed mix for mine bench, facilities, and sediment pond areas.	A-13
A-4.	Upland and sideslope seed mixture for temporary and final revegetation.	A-14
A-5.	Seed mix for roads.	A-15
A-6.	Shrub transplants for final revegetation.	A-15

CHAPTER 1

PURPOSE AND NEED FOR ACTION

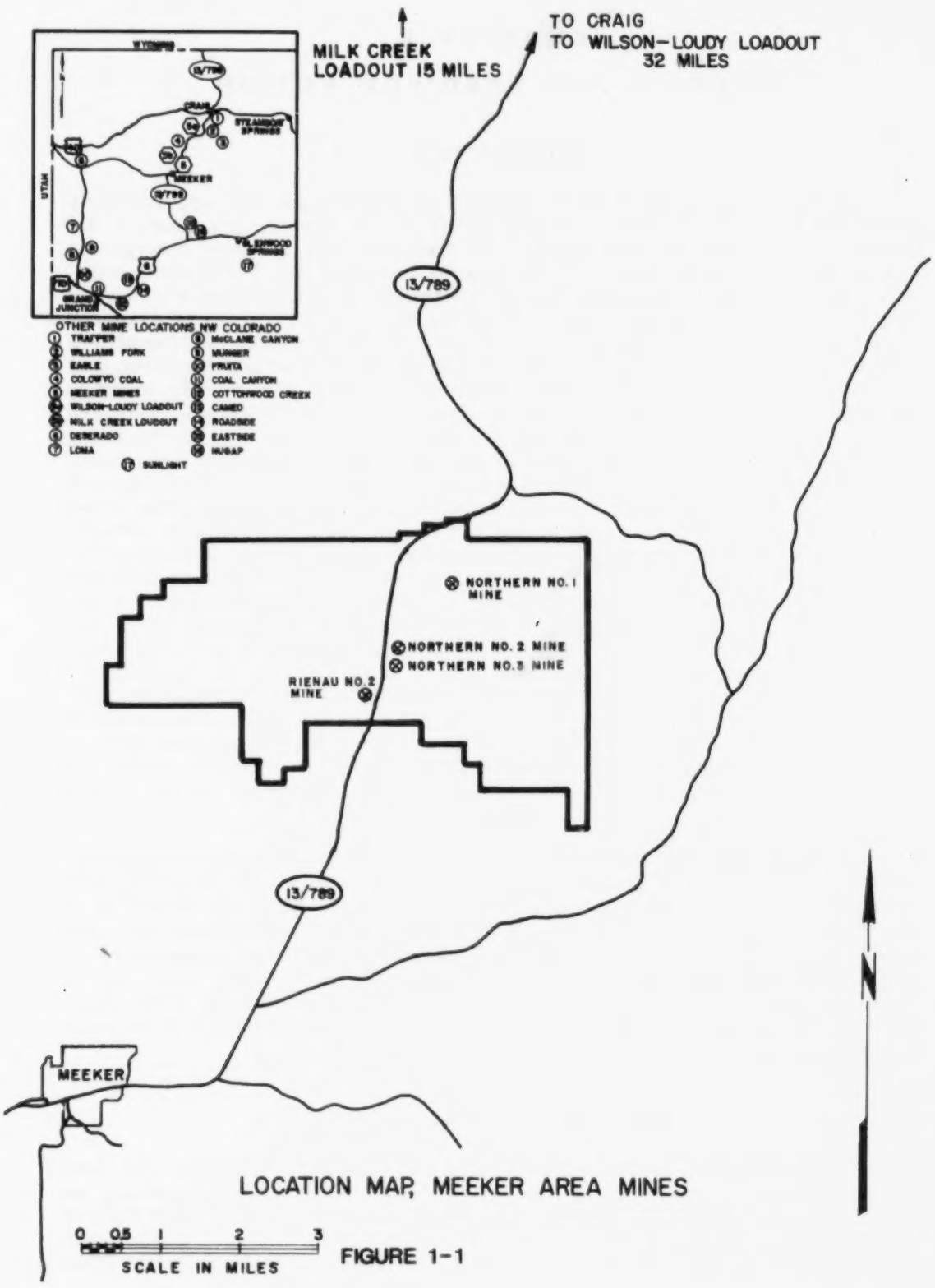
INTRODUCTION

Northern Coal Company (NCC) proposes to underground mine approximately 83,270,000 tons of coal over a 29-year period at the Meeker area mines in Rio Blanco County, Colorado. (See figure 1-1.) Basically, NCC proposes underground mining of new Federal coal from the existing Northern No. 1 (FF seam) mine, underground mining of additional Federal and private (fee) coal from the existing Rienau No. 2 (G seam) mine, creation of the Northern No. 2 (the Upper P seam and the P seam) and Northern No. 3 (J seam) mines for the underground mining of new Federal and private (fee) coal, and construction of ancillary surface facilities, haul roads, and the Milk Creek rail loadout. However, in a November 6, 1981, letter to the Office of Surface Mining Reclamation and Enforcement (OSM), NCC indicated that it was reconsidering its development plans for the Meeker area mines, citing that production from the Rienau No. 2 mine had been curtailed and that various options, including sale of the Meeker area mines property, were being evaluated. NCC stated that, given this turn of events, it would not initiate construction activities for the Northern Nos. 2 and 3 mines in 1982, as originally planned, although the eventual construction of Northern Nos. 2 and 3 has not been ruled out. To this end, NCC indicated that the company would focus its efforts on providing additional environmental baseline information and the engineering plans for the Northern No. 1 and Rienau No. 2 mines. Detailed engineering plans and subsequent permit acquisition for the new facilities proposed for the Northern Nos. 2 and 3 mines and the Milk Creek rail loadout will await further development decisions from NCC. Nevertheless, the potential impacts from the proposed development and construction of the Northern Nos. 2 and 3 mines, their ancillary surface facilities and haul roads, and the Milk Creek rail loadout are considered in this draft environmental impact statement (EIS) in order to present a worst-case analysis of the impacts that could occur in the area as a result of coal mining operations.

On August 24, 1982, while this draft EIS was in its final stages of preparation, NCC, in a letter to the Colorado State Mined Land Reclamation Division (CMLRD), requested a temporary cessation of operations on Northern No. 1 and Rienau No. 2 mines. NCC emphasized in this letter that work on permitting Northern No. 1 and Rienau No. 2 mines, and the Wilson-Loudy loadout facility, would continue due to NCC's uncertainty on what to do with its mines. OSM believes that since NCC is uncertain what it will be doing, and since NCC is still pursuing the MRP/permit approval, the worst-case analysis approach was still indicated because of the large in-place coal reserves in this area.

PROPOSED FEDERAL ACTIONS

Proposed Federal actions would involve three separate decisions. The first action would be a decision by the Secretary of the Interior on NCC's mining and reclamation plan (MRP). The second action would be a decision by the Secretary on the competitive leasing of the 600 acres of unleased land. The third action would be a decision by the U.S. Bureau of Land Management (BLM) Colorado State



LOCATION MAP, MEEKER AREA MINES

FIGURE 1-1

Director on the noncompetitive leasing of NCC's preference right lease applications (PRLA's). The three separate actions are independent of one another, and the approval and/or disapproval of one would not alter the decision process for the others. The actions are proposed under Regulations Pertaining to Coal Management, Federally Owned Coal (43 CFR 3400; see appendix B). The MRP was submitted to OSM and CMLRD on June 13, 1980. Appropriate mitigation measures required of NCC by the various agencies would bring the proposed action, if approved, into compliance with the Surface Mining Control and Reclamation Act of 1977 (SMCRA; 30 U.S.C. 1201 et seq.), CMLRD Rules and Regulations pursuant to the Colorado State Surface Coal Mining Reclamation Act (34-33-101 et seq.), and other Federal laws such as the National Historic Preservation Act, the Bald Eagle Act, and the Endangered Species Act (see chapter 4).

NEED FOR FEDERAL DECISIONS

NCC has submitted an MRP to OSM and the CMLRD for the proposed underground mining of coal at the Meeker area mines. In this MRP, the Meeker area mines study area includes about 4,750 acres of land consisting of five Federal coal leases, one private (fee) coal lease, and one PRLA. For purposes of impact analyses, these additional lands are considered in the draft EIS as part of the Meeker area mines study area. In addition, the study area also includes one PRLA of about 3,567 acres of land and approximately 600 acres of unleased land, both located west of the MRP land area. Under applicable Federal laws, the Secretary is required to make a decision on the MRP. To date, NCC has indicated to OSM that it would focus its efforts on providing additional environmental baseline information and engineering plans for the Northern No. 1 and Rienau No. 2 mines. Detailed engineering plans and subsequent permit acquisition for the proposed Northern Nos. 2 and 3 mines would await further development decisions from NCC. Nevertheless, NCC would still be in a position to potentially receive permanent program permits from OSM for the Northern No. 1 and Rienau No. 2 mines. Additional required Federal actions would include a decision by the Secretary on the competitive leasing of the 600 acres of unleased land, and a decision by the BLM Colorado State Director on the noncompetitive leasing of NCC's PRLA's.

CHAPTER 2

ALTERNATIVES INCLUDING THE PROPOSED ACTION

INTRODUCTION

In analyzing NCC's proposal (which includes PRLA C-0126999), OSM and BLM have determined there are four reasonable alternatives. These are:

- Alternative A, which discusses the possible decision to approve NCC's proposal, PRLA C-0126997, and the competitive leasing, with protective measures, of 600 acres of unleased land, is the preferred alternative.

- Alternative B discusses the possible decision to approve NCC's proposal without PRLA C-0126997 and without the unleased 600 acres of land.

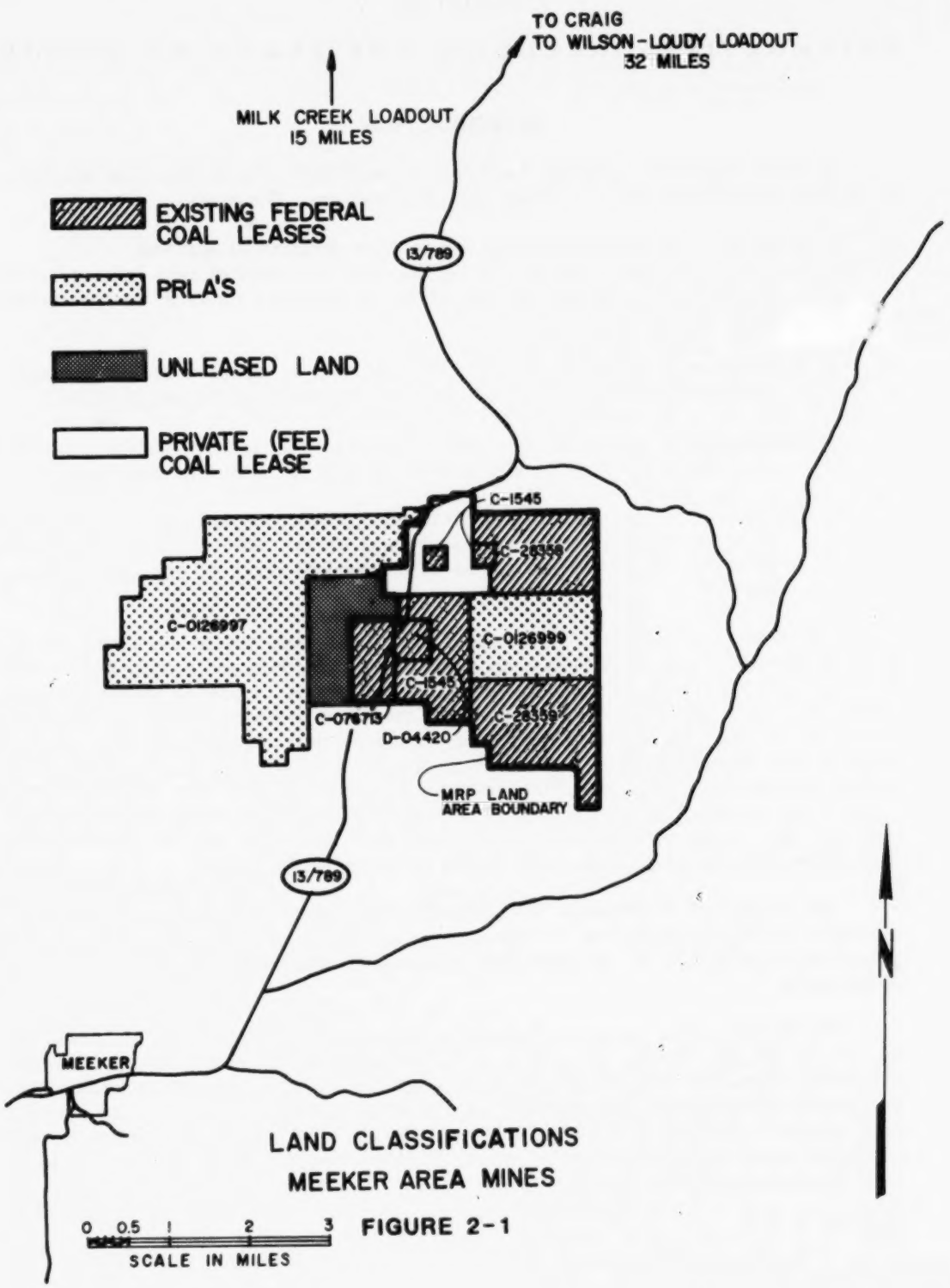
- Alternative C discusses the possible decision to approve NCC's proposal with PRLA C-0126997, but without the 600 acres of unleased land.

- Alternative D discusses the possible disapproval (no action) of alternative A in its entirety, causing disapproval of the MRP, rejection of both PRLA's, and a decision not to offer the 600 acres of unleased land for lease.

The preferred alternative addresses the worst-case scenario--mining of all existing leases, mining of PRLA's C-0126997 and C-0126999, and mining of the 600 acres of unleased lands adjacent to the applicant's lease. Located on the existing leases are two operating mines, Northern No. 1 and Rienau No. 2. Surface disturbances, the surface facilities, the transportation system, and the loadout facilities for these two mines have been in operation for several years. Therefore, except for impacts resulting from increased production, no new impacts would result from approval of the preferred alternative if mining were limited to the existing operations, but utilizing the worst-case scenario, we are making the assumption that Northern Nos. 2 and 3 may be mined in the future.

The preferred alternative includes the applicant's proposal as discussed in appendix A, mining operation as noted in appendix A, requirements of laws and regulations applicable to the preferred alternative, and BLM lease conditions and stipulations.

The Meeker area mines are located in sec. 3, T. 1 N., R. 93 W., and secs. 16, 20, 21, 22, 27, 28, 29, 32, 33, and 34 of T. 2 N., R. 93 W., in Rio Blanco County, northwest Colorado, along Colorado State Highway 13/789. The Meeker area mines study area encompasses approximately 8,917 acres of land and consists of Federal coal leases D-044240, C-076713, C-1545, C-28358, C-28359, W. M. Jensen private (fee) coal lease, PRLA's C-0126997 and C-0126999, and 600 acres of unleased land. (See figure 2-1 and table 2-1).)



LAND CLASSIFICATIONS
MEEKER AREA MINES

FIGURE 2-1

Table 2-1.--Mine acreage data

(Data are in acres)

Area	Mineral ownership in study area			Surface ownership		
	Leased		Unleased Federal coal			
	Federal	Private		Federal	Private	Total
D-044240----------	160	----	0	80	80	160
C-076713----------	320	----	0	120	200	320
C-1545------------	896.07	----	0	280	616.07	896.07
C-28358-----------	886.16	----	0	0	886.16	886.16
C-28359-----------	1,000	----	0	240	760	1,000
PRLA C-0126997----	----	----	3,566.38	920	2,646.38	3,566.38
PRLA C-0126999----	----	----	960	120	840	960
Unleased area-----	----	----	----	----	----	*600
Jensen fee lease--	----	528	----	----	528	528
				Grand total----------		8,916.61

*Approximate acreage.

ALTERNATIVE A: PREFERRED ALTERNATIVE

This alternative would involve three separate actions under applicable Federal laws. These are:

- A decision by the Secretary on NCC's MRP;
- A decision by the Secretary on the competitive leasing of the 600 acres of unleased land;
- A decision by the BLM Colorado State Director on the noncompetitive leasing of NCC's PRLA's C-0126997 and C-0126999.

If the proposed actions are approved, appropriate mitigation measures would be required of NCC by several agencies to bring the preferred alternative into compliance with applicable Federal, State, and local laws.

APPLICANT'S PROPOSAL

NCC presently mines coal at the Northern No. 1 (FF seam) and Rienau No. 2 (G seam) mines. The coal is stockpiled outside the mines, loaded, and trucked to market or trucked to the existing Wilson-Loudy rail loadout, 32 miles north of these mines. (See figure 1-1.) NCC proposes underground mining of new Federal

coal from the Northern No. 1 (FF seam) mine, underground mining of additional Federal and private (fee) coal from the Rienau No. 2 (G seam) mine, creation of the Northern No. 2 (the Upper P seam and the P seam) and Northern No. 3 (J seam) mines for mining new Federal and private (fee) coal, and construction of ancillary surface facilities and haul roads. (See figure 3-2 for location of mines and coal seams.) NCC also proposes to construct a new rail loadout at the Milk Creek site, 15 miles to the north of the Meeker area mines. (See figure 1-1.)

NCC anticipates that the Wilson-Loudy rail loadout would be utilized until annual production from the Meeker area mines reaches 1.5 million tons. This is projected to occur approximately 2 years after permit approval. The Milk Creek rail loadout would then be constructed and used until the annual production reaches about 3 million tons, projected to be more than 3 years after permit approval, or at such time as sales contract requirements and transportation economics necessitate construction of a larger loadout.

Each of the mines would involve a phased development in which the coal mining advance of the upper seams would precede that of the lower seams. Average annual production of the project is estimated to increase to 3,500,000 tons in the fifth year of mining, with a peak estimated production capacity of 4,249,050 tons occurring about the 11th year of operation. (See appendix A.)

If the decisions are made (1) to competitively lease the 600 acres of unleased land and NCC acquires the lease, and (2) to lease PRLA C-0126997 noncompetitively to NCC, then the leases would be mined through the existing or proposed portals already identified. No surface facilities or disturbances would be necessary for PRLA C-0126997 or the 600 acres of unleased land.

Specifically, NCC projects the following production schedule for the Meeker area mines:

- The projected maximum production rate for the Northern No. 1 mine is 392,000 tons/year with an expected mine life of 17 years, producing a total of 6,646,683 tons. If PRLA C-0126997 was added, an estimated 38 years could be added to the mine life for a total of about 55 years and 21,543,000 tons recoverable. This mine would not mine any FF seam coal in the 600 acres of unleased land since the FF seam does not occur there.

- The projected maximum production rate for the Northern No. 2 mine is 980,000 tons/year with an expected mine life of 20 years, producing a total of 16,170,671 tons. If PRLA C-0126997 and the 600 acres of unleased land were included, the mine life would be increased by 22 years for a total of about 42 years and 37,926,000 tons produced.

- Northern No. 3 mine has a projected maximum production rate of 1,573,500 tons/year with an expected mine life of 29 years, producing a total of 34,458,225 tons. If PRLA C-0126997 and the 600 acres of unleased lands are included, the mine life would be increased by 19 years for a total of about 48 years and 64,502,000 tons produced.

- Rienau No. 2 mine has a projected maximum production rate of 1,304,000 tons/year with an expected mine life of 29 years, producing a total of 25,994,694 tons. If PRLA C-0126997 and the 600 acres of unleased lands were included, the mine life would be increased by 30 years for a total of about 59 years and 65,637,000 tons produced.

A summary of NCC's mining operation procedures are attached as appendix A. The reviewer should read appendix A before proceeding further, as the impact analysis is based, in part, on the action on the environment described in NCC's proposed mining operation as modified by applicable laws and stipulations that follow.

PLANNING AND ENVIRONMENTAL CONTROLS

The following is a list of measures that would be required of NCC to assure that the application complies with Federal, State, and local laws. These measures have been identified from available information contained in NCC's MRP, BLM's preliminary draft environmental assessments for PRLA's C-0126997 and C-0126999, and consultations with OSM and BLM. It must be emphasized that a technical analysis by the CMLRD is ongoing on NCC's MRP, and the following list may increase or decrease as concerns are identified or resolved.

MRP Mitigation Measures

Subsidence

- NCC has proposed a subsidence control plan in the MRP. This plan would likely minimize subsidence damage to the surface, to the extent technologically and economically feasible, to maintain the value and use of surface lands. The subsidence control plan would include a description of proposed mining methods and measures to be taken to prevent and/or mitigate effects of subsidence. A detailed monitoring program to predict the effects of advance mining in a small area between Curtis Creek and State Highway 13/789 would be implemented.

  Upon completion of test area monitoring under an area between Curtis Creek and State Highway 13/789, NCC would prepare an analysis of the subsidence monitoring data collected. No secondary mining would begin in areas designated as critical until the report has been reviewed and approved by the regulatory authorities. If the results of that analysis determine that a revision of the MRP is appropriate, NCC would complete the appropriate revisions and then submit them to the regulatory authority for review and approval before entry into the area.

Waste Disposal

- NCC would provide a plan for non-coal waste disposal at a designated site within the MRP land area.

- All toxic wastes would be placed in the refuse disposal site and 4 feet of nontoxic materials would be used as cover. There would be sufficient salvagable nontoxic solid materials in the refuse disposal area to meet

the 4-foot burial-depth requirement. If the waste is nontoxic, the burial depth requirement of 2 feet would be met.

Water Quality and Hydrology

- NCC would maintain the approved water quality/quantity monitoring network specified in the MRP and modified by permit approval.

- If necessary, as indicated by the water quality monitoring network, NCC would treat the waters discharged from the mines and/or the various ponds (including subsurface discharges) to bring them to a quality that complies with Federal and Colorado requirements.

- NCC would maintain in effect a water augmentation plan to compensate for any water loss to Curtis Creek owing to water uses for mining.

Postmining Land Use

- For areas to be disturbed, NCC would provide information as designated by the regulatory authority necessary to evaluate the suitability of established reference areas. Such information would be provided pursuant to existing regulations.

- Before the MRP is approved, NCC would consult with the surface owner to verify postmining land use; on Federal lands, the postmining land uses must be approved by the surface managing agency.

Revegetation

- NCC would provide information concerning the use of introduced species and obtain approval from the surface owner or delete these species from the MRP. In addition, NCC would monitor, as designated by CMLRD, species cover and density on revegetated areas until such a time that monitoring data substantiates that cover and density are within levels required by State law.

- NCC would also develop and provide milestone information detailing revegetation schedules.

- NCC would provide information and develop success criteria in conjunction with OSM, BLM, and the CMLRD for the establishment of woody plant densities on disturbed areas.

Prime Farmlands

- Before MRP approval, NCC shall provide a proper negative declaration concerning prime farmlands, as stipulated under Federal law and criteria set forth by State law.

Wildlife Protection

- NCC would submit to the regulatory authority a plan to mitigate loss of elk critical winter habitat at the refuse disposal site. This plan would be developed in concert with Colorado Division of Wildlife (CDW) and approved by BLM. The plan would include the following:

  + Topographic mapping of the specific locations where vegetation and topography offer potential as elk critical winter range.

  + Detailed justification and description of the size of the proposed mitigation area(s), including existing vegetation, exposure, slope, elevation, proximity to other mine use areas, and any proposed seeding of bladed areas.

  + A maintenance plan for the mitigation program.

- NCC would, if deemed necessary, submit to the regulatory authority, within 3 months after approval of the MRP, a proposed monitoring program for deer and elk moving thoughout the MRP land area, both from north to south and from east to west. The monitoring program should also verify the effectiveness of the proposed mitigation measures discussed in the previous stipulation. Monitoring data should be submitted annually to the regulatory authority for assessment. If monitoring data indicate that currently proposed mitigation measures are not effective, or that annual migration is being impeded by mining activities, NCC would be required to propose alternative mitigation measures.

- NCC would facilitate free deer and elk movement throughout the study area (except exclusion from hazardous areas).

- NCC would, if deemed necessary, submit to the regulatory authority, within 3 months after approval of the MRP, and after consultation with the USFWS and BLM, a plan to establish nest site buffer zones and activity restrictions for the four golden eagle nests recently identified within and adjacent to the MRP land area by BLM personnel. In addition, buffer zones and activity restrictions designed to protect the eight red-tailed hawk nest sites within the MRP land area would be developed in concert with and approved by the BLM within the above timeframe.

Cultural Resources

- NCC may seek approval in later 5-year permits for the proposed Milk Creek rail loadout area. If it does, the following information and mitigation measures would be required by BLM. NCC will submit the final report on the cultural resource investigations at the proposed Milk Creek rail loadout area to OSM for review and approval. Sufficiently justified eligibility assessments and mitigation recommendations, as necessary, for sites 5MF426, 5MF427, 5MF428, 5MF429, and 5MF656 would be included in this report to satisfy deficiencies in the MRP. NCC will implement the mitigation measures in strict adherence with the objectives, methods, and techniques specified in the mitigation

proposal approved by OSM and the Colorado State Historic Preservation Officer (SHPO). The measures will be implemented in accordance with Federal regulations, and any deviations from the approved proposal must first be submitted to OSM for approval.

- Prior to MRP approval, NCC will submit a plan to OSM and the Colorado SHPO for review and approval to monitor and mitigate the potential adverse impacts of subsidence on site 5RB1219.

- Prior to MRP approval, a final eligibility assessment should be made for site 5B1224 in consultation with the regulatory authority and Colorado SHPO. If determined eligible, a plan for mitigation of any potential impacts to the site should be submitted for review and approval to the regulatory authority and the Colorado SHPO. No surface disturbing activities shall take place until the mitigation measures have been implemented and a report of mitigation activities has been submitted for review and approval to the regulatory authority and the Colorado SHPO.

- Within 30 days of acceptance of departmental approval, NCC will submit final assessments of eligibility of sites 5RB1225 through 5RB1228, inclusive. If, as believed, the change in status to "potentially eligible" noted in the response to OSM's initial Completeness Review is an error, this defect can be corrected by a letter to OSM to that effect. If the change in status reflects a reassessment of these sites, sufficient documentation will be provided to allow OSM to begin consultation with the Colorado SHPO.

- If, during the course of mining, previously unidentified cultural resources are discovered, NCC will ensure the resources are not disturbed and will notify OSM. The operator will ensure that the resources are properly evaluated in terms of the National Register of Historic Places (NRHP) eligibility criteria (36 CFR 60.6). Should a resource be determined eligible for listing in consultation with OSM and the Colorado SHPO, NCC will confer with and obtain the approval of OSM and the Colorado SHPO concerning the development and implementation of mitigation measures, as appropriate.

Socioeconomics

- NCC will comply with the Rio Blanco County Impact Regulation, as determined necessary by the county. This will ensure that appropriate socioeconomic impact mitigation measures are addressed prior to initiation of the project. OSM will document any mitigation agreements developed by NCC and the county in the MRP permit action.

BLM's Measures for Existing Federal Coal Leases C-1545, C-28358, and C-28359

General

- Buffer zones designed to minimize adverse impacts to red-tailed hawk and golden eagle nesting would be established. The designated buffer zones are as follows:

T. 2 N., R. 93 W., 6th P.M.

Sec. 20: SE¼SE¼SE¼
Sec. 21: S½SW¼SW¼, SW¼SE¼SW¼
Sec. 28: NW¼NE¼NW¼, N½NW¼NW¼
Sec. 29: NE¼NE¼NE¼

Within these designated buffer zones:

+ Facility restrictions.--Portals, tipples, haul roads, or other major, permanent ancillary features, which BLM determines would jeopardize the continued use of established raptor nests or prevent successful reproduction efforts, will not be allowed;

+ Activity restrictions.--Temporal restrictions on mine activities would be imposed on a site-specific basis by BLM, depending on activity timeframes, raptor occupation of nest sites, frequency of use, conspicuousness, and persistence. The seasonal restriction would coincide with the raptor nesting season, March 1 (nest initiation) to July 31, or until chicks have fledged.

- No surface facilities or surface occupancy would be allowed on the following described lands except on a site-specific basis. Surface facilities and occupancy allowed would be determined jointly by CDW and BLM. (The area is unsuitable for surface mining and, with stipulations, suitable for subsurface mining; see appendix C, criteria 15.)

T. 2 N., R. 93 W., 6th P.M.

Sec. 20: S½S½SE¼
Sec. 21: NE¼, S½SW¼NW¼, N½NW¼SW¼, S½S½SW¼, E½SE¼, N½NW¼SE¼, S½SW¼SE¼
Sec. 22: All
Sec. 29: N½NE¼

- The area in the SE¼NE¼ sec. 3, T. 1 N., R 93 W., 6th P.M., within right-of-way C-22713 (high-voltage transmission line of Western Area Power Administration), is considered suitable for surface mining and facilities provided the parties involved in the right-of-way agree to mining or to having the right-of-way moved. In event that this agreement is not obtained, the area with right-of-way C-22713 shall be considered unsuitable for surface mining or surface facilities (applicable to Federal coal lease C-28359).

BLM's Mitigation Measures for PRLA's C-0126997, C-0126999, and the 600 Acres of Unleased Land

Mitigation measures for PRLA's C-0126997, C-0126999, and the 600 acres of unleased land are discussed as those common to all areas, and those specific to the PRLA's or the unleased land.

The following mitigation measures are common to all PRLA's and the 600 acres of unleased land. In the event of leasing, the following measures will be incorporated as special stipulations in the applicable lease:

General Mitigation Measures

- All stipulations concerning compliance with the requirements of SMCRA will be included in the document approving the MRP.

- The lessee shall be required to mitigate for mule deer, elk, antelope, and sage grouse habitat loss where applicable and the resultant loss of displacement of these species, as key indicator species, due to coal mining operations. Concurrently with the filing of its MRP, the lessee shall submit for approval to BLM a habitat recovery and replacement plan for protection or enhancement of mule deer, elk, antelope, and sage grouse populations affected by habitat loss or displacement from historic habitat.

  The habitat recovery and replacement plan shall be developed in consultation with BLM and CDW on the basis of estimates of lost and disturbed habitat as described in the Meeker area mines final environmental impact statement (FEIS). If the MRP submitted by the lessee indicates figures different from those used in the FEIS as to quality and quantity of habitat lost or disturbed, mitigation alternatives shall be recalculated on the basis of the revised data contained in the MRP.

  The final habitat recovery and replacement plan shall indicate the methods to be employed by the lessee that will ensure that the carrying capacity of the recovered or replaced land has the capacity to support the applicable indicator species agreed upon by BLM and CDW.

  Mitigation methods may require the lessee to use techniques for wildlife range manipulation or intensive wildlife range management. Habitat recovery may not be completely feasible in the MRP land area; therefore, recovery or replacement may be accomplished on the lands made available through the surface management agency, the State, or the lessee outside the MRP land area in combination with recovery and replacement methods on suitable lands within the MRP land area.

  The habitat recovery and replacement plan shall include the following:

  + A habitat analysis of the MRP land area which:

    . Identifies the above species that occupy the MRP land area, and
    . Includes an analysis of the quality carrying capacity of the habitat for those species.

  + A detailed description of the methods selected by the lessee to mitigate habitat loss, together with a comparative analysis of alternate methods that were considered and rejected by the lessee and the rationale for the decision to select the proposed methods.

The methods utilized by the lessee for recovery and replacement may include, but are not limited to, the following techniques:

- . Increasing the quantity and quality of forage available to wildlife;
- . Acquiring critical wildlife habitat;
- . Mechanical manipulation of low-quality wildlife habitat to increase its carrying capacity for selected wildlife species; and
- . Recovery, replacement, or protection of important wildlife habitat by selected fencing.

+ A timetable giving the periods of time that will be required to accomplish the habitat recovery or replacement plan and showing how this timetable relates to the overall MRP.

- The lessee shall comply with all valid and applicable laws and regulations of Federal, State, and local governmental authority.

- The lessee shall grant public access to public lands adjacent to the lease by means of existing roads, trails, or ways. If the lessee must destroy or obstruct an existing route, the lessee shall provide an alternate route of equal quality. Public lands within the lease area and roads, trails, and ways constructed by the lessee, shall be made accessible to the public unless such access would interfere with mining operations or create a safety hazard. Limiting access within one-half mile of building and work areas should be adequate for this purpose. Any additional limitation must be approved by BLM.

- The lessee shall prepare and submit to BLM, concurrently with the filing of its mine plan, social, economic, and transportation impact data concerning offsite aspects of the proposed development. These data shall include the following:

  + The estimated number of employees the specific lease operation will require during phases of construction and operations, and the specific years during which each number and type of employees will be required;

  + The estimated transportation mode(s), route(s), and frequency of trips for the extracted resource;

  + Contemplated construction of transportation facilities;

  + The estimated effect of any truck movements on the rate of roadway pavement deterioration, on the design life of the transportation mode, on the level of surface repair, and on overall safety to the motoring public; and

  + The estimated effect of the influx of population resulting from the proposed development on the transportation system at the county and local level.

These data will be updated as follows:

+ Annually during the construction and operation phases until a full or stable level of operation is reached; and

+ Thereafter, whenever a major change in the operation is planned (expansion, change of transportation mode, closing, etc.). This update will be provided at the time plans for such a change are made, not at the time of implementation.

- With regard to cultural resources:

  + Before undertaking any activities that may disturb the surface of the leased lands, the lessee shall make an intensive cultural resource field inventory in a manner specified by the authorized officer of BLM, or of the surface managing agency (if different), of portions of the mine plan land area and adjacent areas, or exploration plan area, that may be adversely affected by lease-related activities and which were not previously inventoried at such a level of intensity. The inventory shall be made by a qualified professional cultural resource specialist (i.e., archeologist, historian, or historical architect, as appropriate), approved by the authorized officer of the surface managing agency (BLM, if the surface is privately owned), and a report of the inventory and recommendations for protecting any cultural resources identified shall be submitted to the Western Technical Center Administrator of OSM (or the District Mining Supervisor of Minerals Management Service (MMS) if activities are associated with coal exploration) and the authorized officer of BLM or the surface managing agency (if different). The lessee shall undertake measures, in accordance with instructions from the Administrator (or the District Mining Supervisor if activities are associated with coal exploration) to protect cultural resources on the leased land. The lessee shall not commence the surface disturbing activities until permission to proceed is given by the Administrator (or the District Mining Supervisor).

  + The lessee shall protect all cultural resource properties within the lease area from lease-related activities until the cultural resource mitigation measures can be implemented as part of an approved mine plan or exploration plan.

  + The cost of makeing the inventory, preparing reports, and carrying out mitigation measures shall be borne by the lessee.

  + If cultural resources are discovered during operations under this lease, the lessee shall immediately bring them to the attention of the Administrator (or the District Mining Supervisor or the authorized officer of the surface managing agency if the Administrator or District Mining Supervisor, as appropriate, is not available. The lessee shall not disturb such resources except as may be subsequently authorized by the Administrator (or the District Mining Supervisor). Within 2 working days of notification, the Administrator (or the District Mining Supervisor)

will evaluate or have evaluated any cultural resources discovered and will determine if any action may be required to protect or preserve such discoveries. The cost of data recovery for cultural resources discovered during lease operations shall be borne by the surface managing agency unless otherwise specified by the authorized officer of BLM or of the surface managing agency (if different).

- With regard to paleontological resources:

  + Before undertaking any surface-disturbing activities on the leased lands, the lessee shall contact the appropriate BLM District Office to determine if the leased lands fall within a Class I-a or Class I-b paleontological classification area.

  + If the leased lands fall within a Class I-a or Class I-b area or in areas not yet classified, a paleontological survey shall be required to establish the presence or absence of scientifically significant fossils as defined by IM WO-17-111. No paleontological surveys will be required in Class II or Class III areas.

  + The paleontological survey shall be made by the appropriate BLM district and/or area geologist, if available. Otherwise, it shall be made by a qualified paleontologist approved by the BLM district geologist.

  + If scientifically significant fossils are encountered during the survey, the lessee's mining plan shall address appropriate steps for salvaging and/or avoiding fossils.

  + Should any vertebrate fossils be uncovered during any surface-disturbing activities or during any mining operations, the BLM Area Manager shall be contacted immediately, as well as the Western Technical Center Administrator of OSM, or the District Mining Supervisor of MMS, as appropriate. Operations may continue as long as the fossils are not destroyed or lost by the activity. An evaluation of the fossils shall be completed by the BLM Area Manager or a BLM-approved paleontologist within 5 working days, and the lessee will be notified as to what actions must be taken.

  + All scientifically significant fossils shall remain under the jurisdiction of the United States until ownership is determined under applicable law. Copies of all paleontological resource data generated as a result of the lease term requirements shall be provided to the BLM district geologist, and to the Western Technical Center Administrator of OSM, or the District Mining Supervisor of MMS, as appropriate.

  + The cost of any required salvage of such fossils shall be borne by the United States.

The following mitigation measures are specific to the PRLA's or to unleased lands, as indicated. In the event of leasing, the following measures will be

incorporated as special stipulations in the applicable lease, or in the mine plan prior to BLM concurrence. as appropriate.

Mitigation Measures for PRLA C-0126997

- Buffer zones designed to minimize adverse impacts to red-tailed hawk and golden eagle nests will be established by BLM lease stipulations. Eagle and red-tailed hawk buffer zones described in unsuitability criterion 11 (see appendix C) would accommodate all raptor nests except one red-tailed hawk nest, and as such, an additional buffer extension would be declared as follows for the red-tail hawk nest:

  T. 2 N., R. 94 W., 6th P.M.

  Sec. 25: S½SE¼, S½SW¼NE¼SE¼
  Sec. 36: N½NE¼NE¼

  Within these designated buffer zones:

  + Facility restrictions.--Portals, tipples, haul roads, or other major, permanent ancillary features that BLM determines would jeopardize the continued use of established raptor nests or prevent successful reproductive efforts would not be allowed.

  + Activity restrictions.--Temporal restrictions on mine activities would be imposed on a site-specific basis by BLM depending on activity timeframes, raptor occupation of nest sites, frequency of use, conspicuousness, and persistence. The seasonal restriction would coincide with the raptor nesting season, March 1 (nest initiation) to July 31, or until chicks have fledged.

- If surface disturbance is proposed for cultural site 5RB1224, a mitigation plan will be required from the lessee as part of the MRP.

- Subsidence monitoring data (as required by OSM) will be provided by the lessee to the BLM Area Manager. If subsidence is determined to be affecting cultural resources, appropriate measures will be taken to mitigate its effect. (See appendix C, unsuitability assessment C-0126997.)

- The lessee will paint above-ground facilities in a nonreflective color to blend with the environment, when not prohibited by regulations.

Mitigation Measures for PRLA C-0126999

- Buffer zones designed to minimize adverse impacts to red-tailed hawk and golden eagle nests will be established by BLM in lease stipulations, as follows:

Facility Restriction Buffer

T. 2 N . R. 93 W.. 6th P.M.

Sec. 27: W½SW¼NW¼SW¼
Sec. 28: SE¼NE¼NE¼SE¼, NE¼SE¼NE¼SE¼

Within this buffer zone, drill pad development and clearing construction of ventilation shaft/access roads, or other ancillary features, which BLM deter nines would jeopardize the continued use of established raptor nests or prevent successful reproductive efforts, would not be allowed.

Seasonal Restriction Buffer

T. 2 N., R. 93 W., 6th P.M.

Sec. 27: W½NW¼SW¼
Sec. 28: E½NE¼SE¼

Within this buffer zone, temporal restriction on mine activities (i.e., exploratory drilling and access road contruction) will be imposed on a site- pecific basis by BLM depending on (1) whether activity timeframes and raptor occupation of nest sites are concurrent, and (2) the nature of the proposed activity, such as location relative to occupied nest sites, frequency of use, conspicuousness, and persistence. The seasonal restriction will coincide with the raptor nesting season, March 1 (nest initiation) to July 31, or until chicks have fledged.

- Roads and facilities will not be constructed on slopes over 25 percent grade due to difficulty of retrieval of sidecast "fill" material and "cut" bank backsloping.

- Exploratory corehole roads will not be bladed except for brush removal and traversing of side slopes. Existing roads will be used where possible.

- The lessee will paint above-ground facilities a nonreflective color to blend with the environment, when not prohibited by regulations.

- No surface disturbing activities will be allowed on cultural sites 5RB1218 and 5RB1219, including their associated 10-acre buffer zone as established by BLM in association with the Colorado SHPO. (See appendix C, unsuitability criterion 7.)

- Subsidence monitoring data for the vicinity of cultural site 5RB1219 (as required by OSM) will be provided by the lessee to the BLM Area Manager biannually. If subsidence is determined to be affecting cultural site 5RB1219, additional mitigation may be required.

- Cultural site 5RB1233 has potential for subsurface cultural deposits. If any surface-disturbing activities are proposed in the vicinity of 5RB1233, the disturbance will be monitored by a qualified professional archeologist. (See cultural resources mitigation for the PRLA's C-0126997 and C-0126999.)

- Cultural site 5RB1234 has potential for subsurface cultural deposits. If any surface disturbing activities are proposed in the vicinity of 5RB1234. the locality should be tested prior to its being disturbed to determine whether subsurface cultural resources are present and to evaluate the site in terms of the NRHP. The cost of testing shall be borne by the lessee. Further mitigation may be required pending the results of the testing.

Mitigation Measures for the 600 Acres of Unleased Land

- The legal descriptions below are unsuitable for surface mining and, with a stipulation, suitable for subsurface mining. (See appendix C, criterion 11.) Stipulation: Surface occupancy and seasonal use restrictions apply. Restrictions will be developed by BLM on a site-specific basis at the MRP development stage.

  T. 2 N., R. 93 W., 6th P.M.

  Sec. 19: SE¼SE¼
  Sec. 30: S½NW¼NE¼SE¼, SW¼NE¼SE¼, SE¼NE¼SE¼, S½NE¼NW¼SE¼, SW¼NW¼SE¼, SE¼NW¼SE¼, SW¼SE¼, SE¼SE¼
  Sec. 31: N½NE¼

- Buffer zones designed to minimize adverse impacts to red-tailed hawk and golden eagle nests will be established by the BLM in lease stipulations. The designated buffer zones are as follows:

  T. 2 N., R. 93 W., 6th P.M.

  Sec. 29: NW¼NW¼, W½NE¼NW¼

  Within these designated buffer zones:

  + Facility restrictions.--Portals, tipples, haul roads, or other major, permanent ancillary features that BLM determines would jeopardize the continued use of established raptor nests or prevent successful reproductive efforts will not be allowed.

  + Activity restrictions.--Temporal restrictions on mine activities will be imposed on a site-specific basis by BLM depending on activity timeframes, raptor occupation of nest sites, frequency of use, conspicuousness, and persistence. The seasonal restriction would coincide with the raptor nesting season, March 1 (nest initiation) to July 31, or until chicks have fledged.

The environmental impacts that would occur if this preferred alternative is approved are described in chapter 4.

ALTERNATIVE B

Alternative B discusses decisions on NCC's proposal (including PRLA C-0126999) without PRLA C-0126997 and without the unleased 600 acres of land.

All of the MRP mitigation measures and BLM's mitigation measures for existing Federal coal leases and for PRLA C-0126999 are applicable to this alternative.

Effects on Northern No. 1.--A total of 6,647,000 tons of FF seam coal would be produced over 17 years. A total of 14,896,000 tons of FF seam coal would not be mined and 3,566 acres would not be undermined.

Effects on Northern No. 2.--A total of 16,171,000 tons of P and Upper P seam coal would be produced over 20 years. A total of 21,756,000 tons of P and Upper P seam coal would not be mined and 4,166 acres would not be undermined.

Effects on Northern No. 3.--A total of 34,458,000 tons of J seam coal would be produced over 29 years. A total of 30,044,000 tons of J seam coal would not be mined and 4,166 acres would not be undermined.

Effects on Rienau No. 2.--A total of 25,995,000 tons of G seam coal would be produced over 29 years. A total of 39,642.000 tons of G seam coal would not be mined and 4,166 acres would not be undermined.

Summary of Impacts.--Under alternative B, 83.270,000 tons of coal would be mined over 29 years. The impacts for this alternative would be the same as for alternative A, except for topography, geology, hydrology, alluvial valley floors, and socioeconomics.

For topography, the area that could be affected by localized subsidence would be about half as large. For geology, 83,270,000 tons of coal would be mined instead of 189,608,000 tons. For hydrology, ground-water depletion would be about half as much per year. The area that could be affected by subsidence would be about half, so the amount of alluvial valley floors to be affected would be reduced by some unknown amount. For socioeconomics, the magnitude of the impacts would be the same but would only last for 29 years instead of lasting for about 60 years.

ALTERNATIVE C

Alternative C discusses decisions on NCC's proposal with PRLA C-0126997 and without the unleased 600 acres of land. All the MRP mitigation measures and BLM's mitigation measures for existing Federal coal leases and for PRLA's C-0126997 and C-0126999 are applicable to this alternative.

Effects on Northern No. 1.--A total of 21,543,000 tons of FF seam coal would be produced over 55 years. Because there is no FF seam coal in the 600-acre unleased area, this alternative is the same as the preferred alternative for this mine.

Effects on Northern No. 2.--A total of 34,790,000 tons of P and Upper P seam coal would be produced over 39 years. A total of 3,136,000 tons of P and Upper P seam coal would not be mined and 600 acres would not be undermined.

Effects on Northern No. 3.--A total of 60,098,000 tons of J seam coal would be produced over 45 years. A total of 4,404,000 tons of J seam coal would not be mined and 600 acres would not be undermined.

Effects of Rienau No. 2.--A total of 59,899,000 tons of G seam coal would be produced over 55 years. A total of 5,738,000 tons of G seam coal would not be mined and 600 acres would not be undermined.

Summary of Impacts.--Under alternative C, 176,330,000 tons of coal would be mined over 55 years. The impacts for this alternative would be the same as for alternative A, except for topography, geology, hydrology, alluvial valley floors, and socioeconomics.

Because the difference in acres to be undermined and tons of coal to be produced is only 7 percent between alternative C and alternative A, the impacts would be reduced by about 7 percent for the named disciplines except for socioeconomics. For socioeconomics. the magnitude of the impacts would be the same but would only last for 55 years instead of lasting for about 60 years.

ALTERNATIVE D

Alternative D is disapproval (no action) of the permit application. No new production would be generated and there would be no disturbance from new Federal coal leasing and subsequent mining. NCC's contracts would not be maintained and fulfilled, customers would have to look elsewhere for coal supplies (which at this time are abundant), and job opportunities would be eliminated. Impacts to wildlife, water resources, soils, cultural resources, topography, mineral resources, and socioeconomics as described in chapter 4 would not occur.

The impacts due to the present mining at Northern No. 1 and Rienau No. 2 would continue until these mines are closed and rehabilitated.

CHAPTER 3

DESCRIPTION OF THE AFFECTED ENVIRONMENT

TOPOGRAPHY

Surface topography for the study area is dominated by the east- to west-trending Danforth Hills to the north and the abrupt escarpment of Rattlesnake Mesa to the south. The relief of the Danforth Hills is moderate to steep. They are drained by small intermittent streams and minor tributaries, which combine to form Sulphur Creek and Curtis Creek, the two perennial streams draining the study area to the south. The southeastern portion of the study area is drained by a small intermittent stream that flows southward through Aichers Draw. Curtis Creek and Sulphur Creek discharge into the White River.

Elevations within the study area range from about 6,900 feet, along Curtis Creek, to about 8,300 feet, along the ridgeline east of the Rienau No. 2 mine. Surface topography within the study area is controlled largely by the trellis drainage patterns of the intermittent creeks and small tributary drainages. Gentle gradients are generally found in the creek valley floors. The steepest gradients tend to occur along slopes adjacent to Curtis Creek and Aichers Draw and throughout the southern part of the study area.

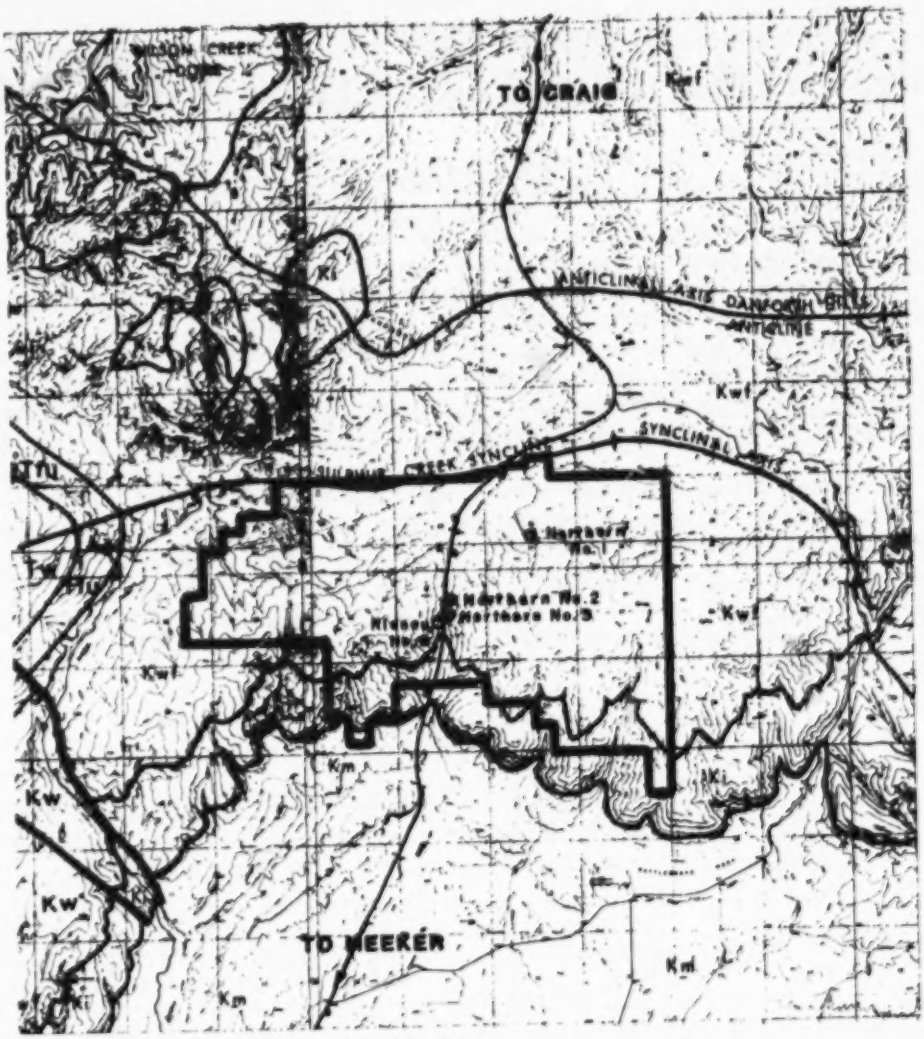
GEOLOGY

The study area is located at the northern end of the Grand Hogback monocline and along the northern terminus of the Danforth Hills anticline, a southeast-trending anticlinal structure associated with the White River uplift to the east. (See figure 3-1.)

In the study area, geology is dominated by the Mesa Verde Group of Upper Cretaceous age. This group involves a complex of formations including the Williams Fork Formation, the Iles Formation, and the underlying Mancos Shale. Locally, the Williams Fork Formation (upper member of the Mesa Verde Group) is overlain by Quaternary and Recent age deposits consisting of alluvial and coarse colluvial material weathered from the older Cretaceous rocks. Within the general study area, the dominant geologic unit is the Williams Fork Formation. The underlying Iles Formation is separated from the Williams Fork Formation by the Trout Creek Sandstone Member, which comprises the uppermost portion of the Iles Formation and is easily recognizable both in outcrop and in cores by its conspicuous white color, thickness, and massive lithologic texture. The Iles Formation crops out only near the southern limits of the study area. Proposed mining operations would be limited to coal seams within the Williams Fork Formation.

The Williams Fork Formation is approximately 3,000 feet thick and is comprised of three principal coal-bearing groups. A relatively coal-barren middle zone, approximately 1,000 feet thick, separates the upper two coal groups from the lower coal unit. In ascending stratigraphic order the coal groups and their approximate thicknesses are:

- The barren interval and the Fairfield coal group (1,300 feet).



LEGEND

EOCENE/PALEOCENE

Tw - Wasatch Formation

Ttu - Tort Union Formation

UPPER CRETACEOUS

Kwf - Williams Fork Formation

Ki - Iles Formation (Top of Trout Creek Sandstone)

Km - Mancos Shale

Ref. Hancock & Eby (1930) and Tweto (1979), modified by Company data

0 0.5 1 2 3

SCALE IN MILES

SURFACE GEOLOGY
MEEKER AREA MINES

FIGURE 3-1

- The Goff coal group (700 feet); and
- The Lyons Canyon coal group (1,000 feet);

Within the study area the Lyons Canyon coal group and its basal Lyons Canyon Sandstone Member have been removed by erosion. The five coal seams, which occur in the Upper Cretaceous age rocks of the Williams Fork Formation, are structurally confined to the Sulphur Creek syncline.

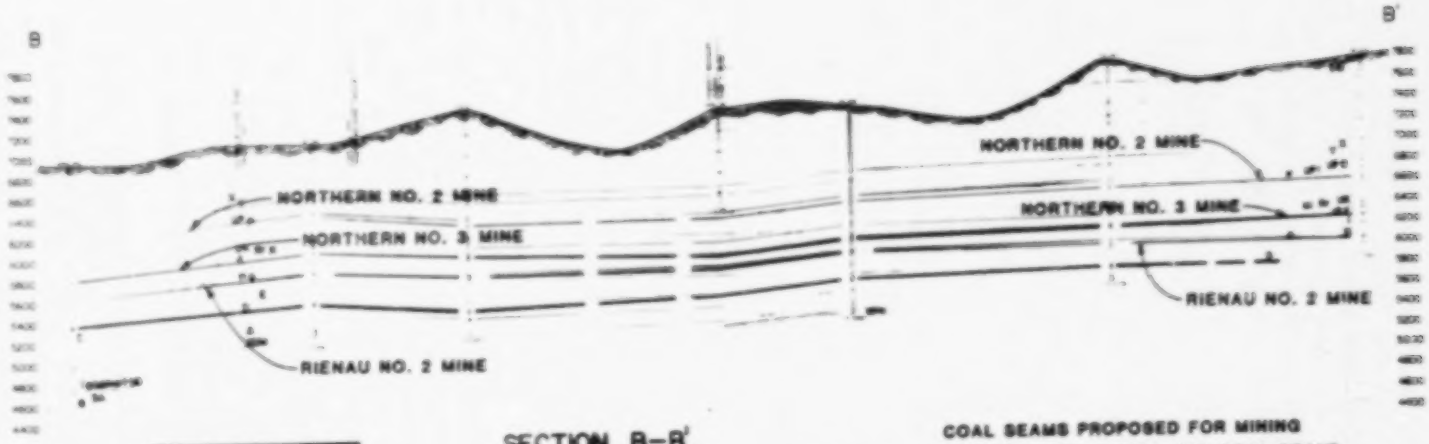
The geologic structure in the study area is controlled largely by the Sulphur Creek syncline, which borders the steeply dipping south flank of the Danforth Hills anticline to the north. (See figure 3-1.) The Sulphur Creek syncline is asymmetric with a north limb dipping steeply to the south at 24° to 45° and a south limb dipping north from 12° to 25°. The structure is doubly plunging, with surface expression of the axis trending approximately N. 83° E. The overburden layers and the G, J, Upper P, P, and FF coal seams generally dip from 12° to 18° north-northwest toward the axis of the Sulphur Creek syncline, as shown in the geologic sections (figs. 3-2 and 3-3). Near the axis (fig. 3-1) dips tend to be shallower, becoming almost level and eventually reversing dip direction on the north side of the syncline. The only faulting reported within the study area occurs in the FF seam in a subparallel pattern near the synclinal axis. Faulting is generally classified as normal, with a left-lateral component of slip commonly less than 10 feet.

Surface outcrops in the study area include the Iles Formation, the Williams Fork Formation, and Recent alluvial deposits. (See figure 3-1.) The alluvial deposits occur along the intermittent drainage courses and vary in both thickness and width. Alluvial deposits in the Curtis Creek drainage average approximately 200 feet in width and vary in thickness up to 30 feet. The alluvial sediments consist predominantly of silt and clay with interlayers of clinker gravel. The Williams Fork Formation is the principal overburden material and is exposed over much of the study area. This formation consists of a thick series of predominantly nonmarine interbedded to laminated sandstone, siltstone, mudstone, shale, carbonaceous shale, and abundant coal seams that vary in thickness. The overburden material is highly variable in lithology and is laterally discontinuous, generally being traceable over short distances. Sandstone units with individual units ranging in thickness from 25 to 50 feet within the overburden are generally fine to medium grained and are thickest in the Fairfield coal group. In the Goff group, the sandstones and other overburden units are thin, erratic, and may contain 15 to 50 percent shale and clay-size fragments as the matrix material.

Considerable information on the coal-seam geology has been developed by the applicant for the MRP land area. NCC has not developed information on the coal-seam geology of PRLA C-0126997, and the 600 acres of unleased land. Thus, the following description of coal-seam geology concentrates on the five coal seams proposed for mining in the MRP land area, which includes PRLA C-0126999.

The G Coal seam (Rienau No. 2 mine) occurs within the Fairfield coal group and is the lowest stratigraphic coal bed proposed to be mined. This coal seam ranges in thickness from a maximum of 22 feet near the western border of the MRP land area to about 6 feet in the northeastern corner of the MRP land area and occurs approximately 550 feet above the base of the Williams Fork Formation. (See figure 3-4.) The dip of the G seam ranges from about 18° N. at the Rienau No. 2 mine to 12° NW. near Aichers Draw. The dip tends toward the

SECTION A-A'



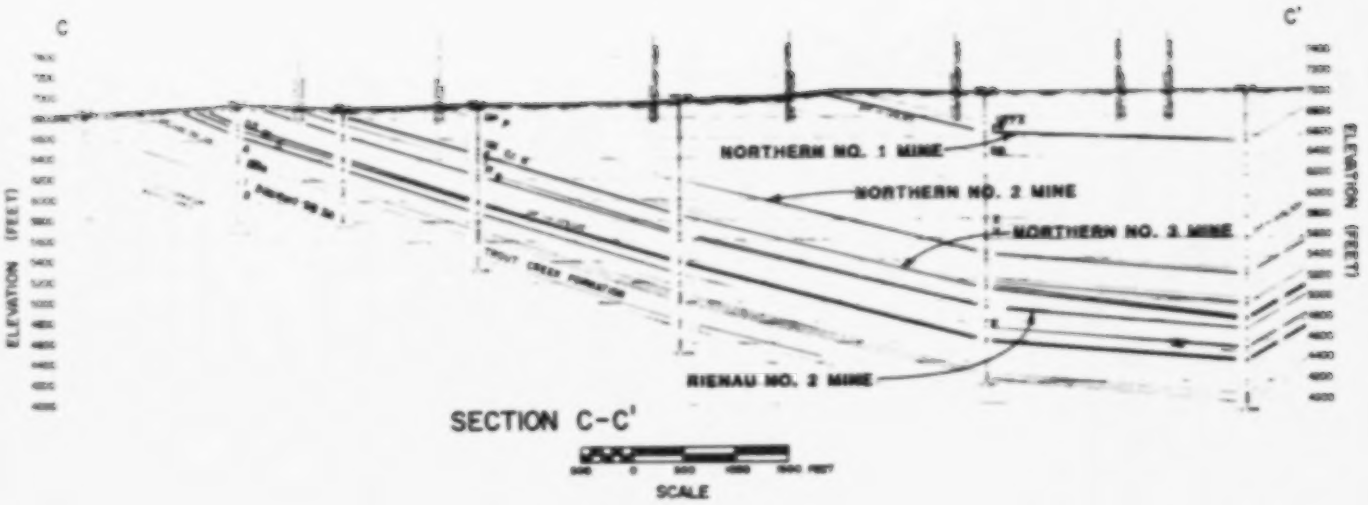
SCALE

SECTION B-B'

GEOLOGIC SECTIONS THROUGH NORTHERN NO. 1, 2, AND 3 AND RIENAU NO. 2 MINES

COAL SEAMS PROPOSED FOR MINING
NORTHERN NO. 1 MINE (FF COAL SEAM)
NORTHERN NO. 2 MINE (UPPER P & P COAL SEAMS)
NORTHERN NO. 3 MINE (J COAL SEAM)
RIENAU NO. 2 MINE (G COAL SEAM)

FIGURE 3-2



SECTION C-C'

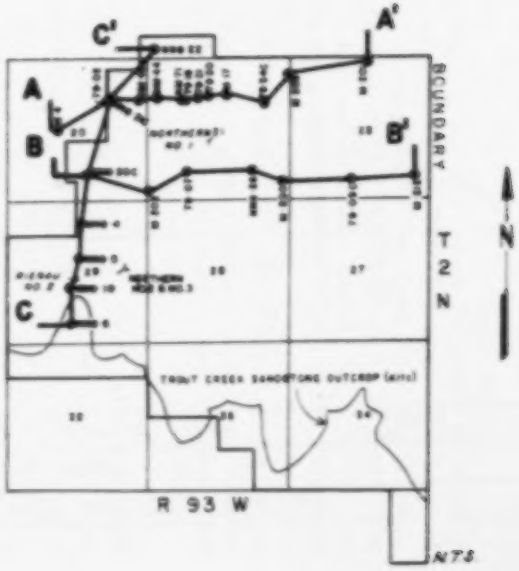
COAL SEAMS PROPOSED FOR MINING

NORTHERN NO. 1 MINE (FF COAL SEAM)

NORTHERN NO. 2 MINE (UPPER P & P COAL SEAMS)

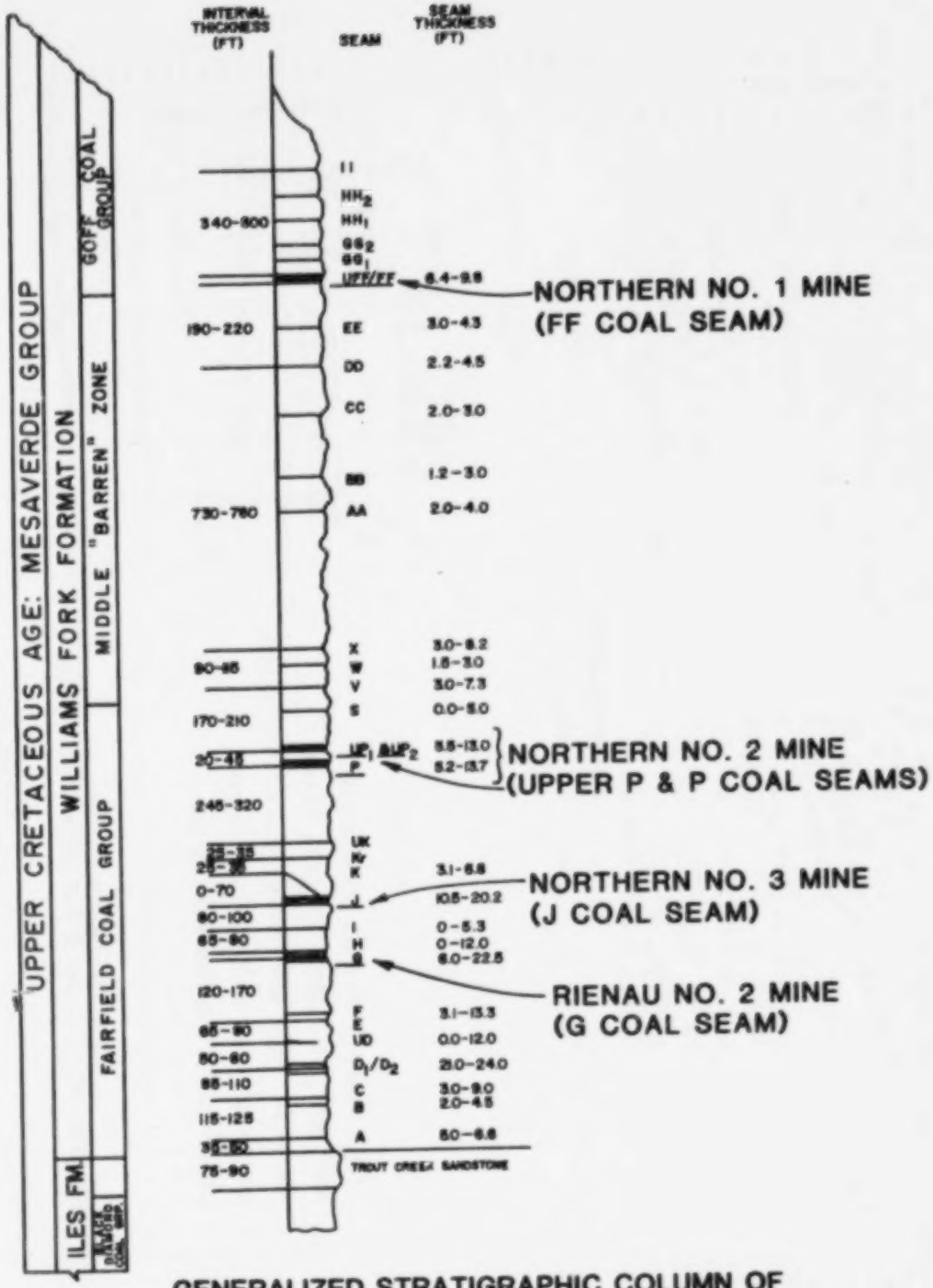
NORTHERN NO. 3 MINE (J COAL SEAM)

RIENAU NO. 2 MINE (G COAL SEAM)



GEOLOGIC SECTION THROUGH
NORTHERN NO. 1, 2, AND 3, AND RIENAU NO. 2 MINES

FIGURE 3-3



GENERALIZED STRATIGRAPHIC COLUMN OF
COAL SEAMS PROPOSED FOR MINING

FIGURE 3-4

horizontal as it reaches the axis of the Sulphur Creek syncline. The thickness of overburden above the G seam ranges from 725 feet in the southern portion of the MRP land area to about 2,400 feet near the northern boundary of the MRP land area.

The J coal seam (Northern No. 3 mine) is the next seam proposed for mining above the G seam. This bed is located approximately 720 feet above the base of the Williams Fork Formation with a separation of 60 to 190 feet from the G seam. The J seam ranges in thickness from 10 to 35 feet and averages about 14 feet. The thickness of overburden above the J seam varies from about 360 feet in the southern portion of the MRP land area to a maximum of 2,300 feet along the northern border of the MRP land area. The dip of the J seam ranges from approximately 15° N. along State Highway 13/789 to 11° NW. along Aichers Draw. The lithology of overburden immediately above the J seam consists of fine-to medium-grained interbedded sandstone, sandy shale, and laminated siltstone and mudstone.

The Upper P and P coal seams (Northern No. 2 mine) are the next stratigraphically higher beds proposed for mining and are located about 1,040 feet above the base of the Williams Fork Formation. The Upper P and P seams occur in a stratigraphic interval of about 50 feet and consist of several laterally persistent and discontinuous coal beds. The individual coal beds range in thickness from about 2 to 14 feet. The thickness of overburden above the Upper P and P seams ranges from about 300 feet in the southern portion of the MRP land area to as much as 1,900 feet along the northern border of the MRP land area. The dip of the Upper P and P seams ranges from about 15° N. along State Highway 13/789 to about 10° N. along Aichers Draw. Overburden and underburden lithologies consist of interbedded sandstone, shale, laminated siltstone and mudstone with some coal.

The uppermost coal bed proposed for mining is the FF seam (Northern No. 1 mine) which is the lowest stratigraphic coal bed in the Goff coal group. This bed is located about 2,200 feet above the base of the Williams Fork Formation and about 1,200 feet above the Upper P and P seams. The FF seam is generally confined to the area along the axis of the Sulphur Creek syncline and attains an average thickness of approximately 9 feet. On the southern limb of the syncline, the dip of the FF seam ranges from about 17° N. to about 0° near the axis of the Sulphur Creek syncline. On the northern side of the axis, the dip exceeds 30° in places. The thickness of overburden above the FF seam ranges from about 150 feet to 583 feet.

SOILS

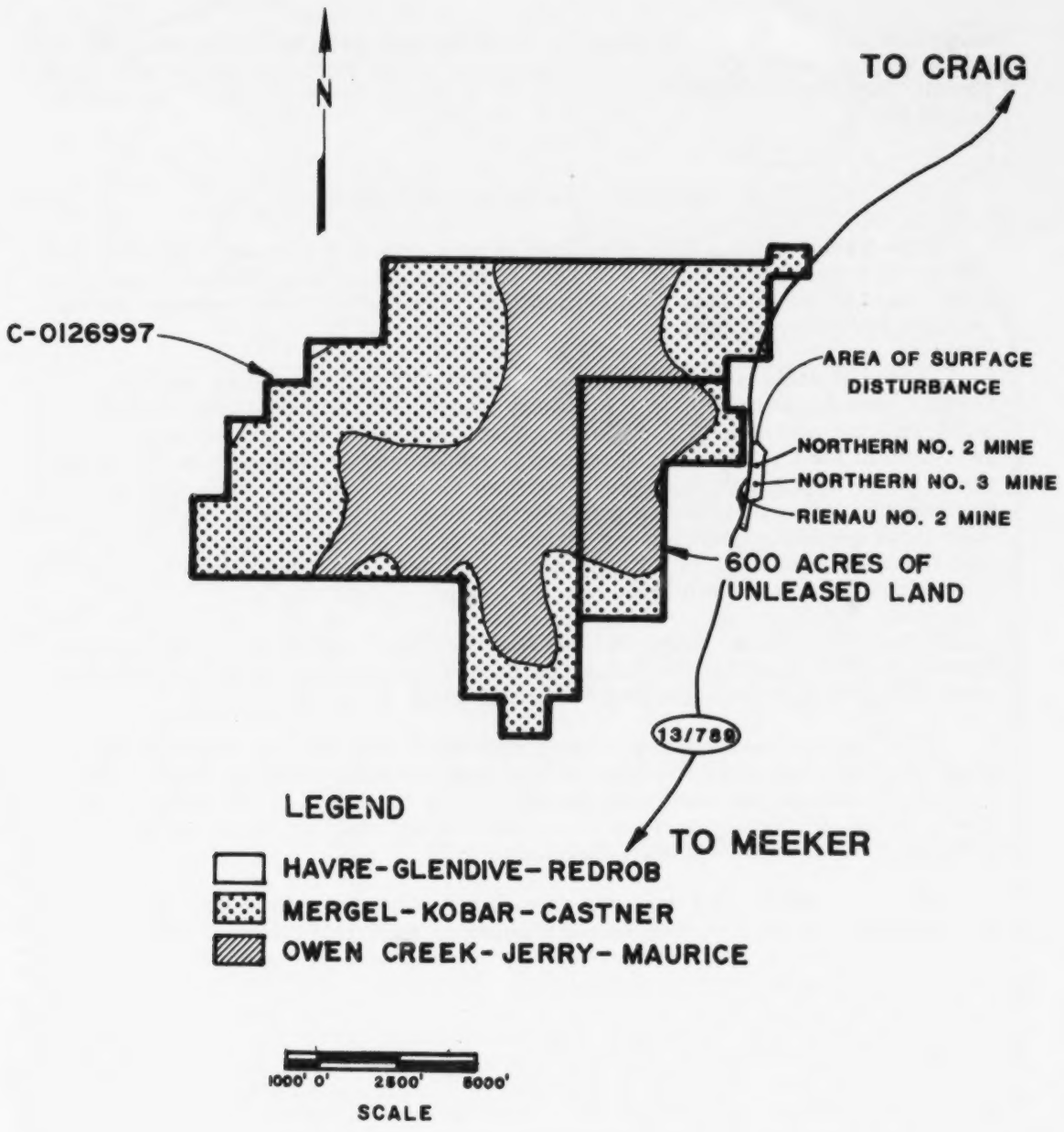
Soils within the study area (figs. 3-5 and 3-6) are typical of the high-altitude basins in west-central Colorado. These soils have developed either in residuum from sandstone, marine shale, and calcareous shales, or from alluvial/colluvial parent materials. The latter parent materials are derived from or are mixtures of the above sedimentary rocks. The soils have dark, moderately thick A horizons with textures ranging from loam to clay loam.

Upon completion of mining operations, suitable soils would be available from disturbed areas for reclamation of those same areas. Approximately 140 acres would be disturbed by the proposed mining in the MRP land area. Enough suitable

TO CRAIG
NORTHERN NO. 1 MINE
TO MEEKER
LEGEND
StB STRAW SOIL, 3 TO 8 PERCENT SLOPES
JyD DOLLARD SILTY CLAY LOAM, 30 TO 60 PERCENT SLOPES
DgF DOLLARD SILTY CLAY LOAM, 60 PECENT SLOPES & STEEPER
ShC SHAWA LOAM, 8 TO 15 PERCENT SLOPES
ShD SHAWA LOAM, 15 TO 30 PERCENT SLOPES
BnD BURNETTE LOAM, 15 TO 30 PERCENT SLOPES
RtE REDTHAYNE GRAVELLY LOAM, 30 TO 60 PERCENT SLOPES
RtF REDTHAYNE GRAVELLY LOAM, 60 PERCENT SLOPES OR STEEPER
MeE MERGEL GRAVELLY LOAM, 30 TO 60 PERCENT SLOPES
OwD OWEN CREEK SILT LOAM, 15 TO 30 PERCENT SLOPES
JeD JERRY LOAM, 15 TO 30 PERCENT SLOPES
RhC RHONE LOAM, 8 TO 15 PERCENT SLOPES
DL DISTURBED LAND
WATER
SAMPLE POINT LOCATION
SPRING OR WET AREA
SALINE OR SODIC SOILS
SCARP
ACTIVE LANDSLIDE
ROCK OUTCROP
FENCE
600' 0' 600' 1200'
SCALE

SOIL ASSOCIATIONS WITHIN THE MRP LAND AREA

FIGURE 3-5



SOIL ASSOCIATIONS FOR PRLA C-0126997 AND UNLEASED LAND

FIGURE 3-6

soil would be available at the minesites to revegetate disturbed areas including the refuse disposal site. Owing to the long storage times projected for the stockpiled topsoil, fertilizer amendments would most likely be needed to provide essential nutrients.

SURFACE-WATER HYDROLOGY

The Meeker mining area is drained by two perennial streams, Sulphur Creek and Curtis Creek. In addition, a number of small intermittent tributaries drain the area. Most of the available information is for the Curtis Creek drainage and was provided by NCC in its MRP.

Approximately seven watersheds totaling 9.21 square miles comprise the Curtis Creek drainage basin in the vicinity of the Meeker area mines. Based on a water balance analysis, NCC estimates that the surface and ground-water runoff generated in the Curtis Creek watershed is approximately 1.9 inches in an average year. Most of the runoff is produced from October through June, with evapotranspiration greatly exceeding precipitation from July 1 through September 30. High flows generally occur during the spring as a result of snowmelt. However, high flows can result during the winter from rainfall on a ripened snowpack, or in the summer from thunderstorms.

The Curtis Creek valley can be described as a simple lower terrace unit forming a flood plain and containing an incised meandering channel. Two stock ponds are present in the valley bottoms within the proposed mining area.

The Curtis Creek channel is well defined throughout the proposed mining area. In the natural state, no surface flow component exists during approximately 8 out of 10 years on the small tributaries of Curtis Creek within the proposed mine area. Flow monitoring stations have been established at three Curtis Creek locations and on two tributaries. (See figure 3-7.)

Although there is lack of long-term data on erosion and sediment yield for the Meeker area mines, it has been estimated by NCC that source-area sediment yields range from 0.3 to 0.7 acre-foot per square mile per year for watersheds similar to the Curtis Creek watershed.

From 1977 to 1979, NCC monitored Curtis Creek for various water parameters at two locations near the Rienau No. 2 mine. In summary, the data from this study show downstream increases in total dissolved solids (TDS), sulfate (SO_4), bound CO_2, and temperature. Downstream decreases in concentrations between the two monitoring stations were observed for manganese (Mn), iron (Fe), and chloride (Cl). Total suspended solids (TSS) and pH showed no trend.

Additional water quality monitoring stations were established in 1979 by the applicant. (See figure 3-7.) The sites HFS-1, HFS-2, and HFS-3 each contain a crest-stage gage and a single-stage sediment sampler. Data, including flow information, are collected monthly. Monthly samples are taken for pH, TSS, TDS, Fe (total), Mn (total), and SO_4. Two flume stations with continuous stage recorders were also established in 1979 by NCC, and are monitored for streamflow and water quality. These are known as sites HRS-1 and HRS-2. (See figure 3-7.)

"Full suite" parameters analyzed quarterly by NCC are shown in table 3-1:

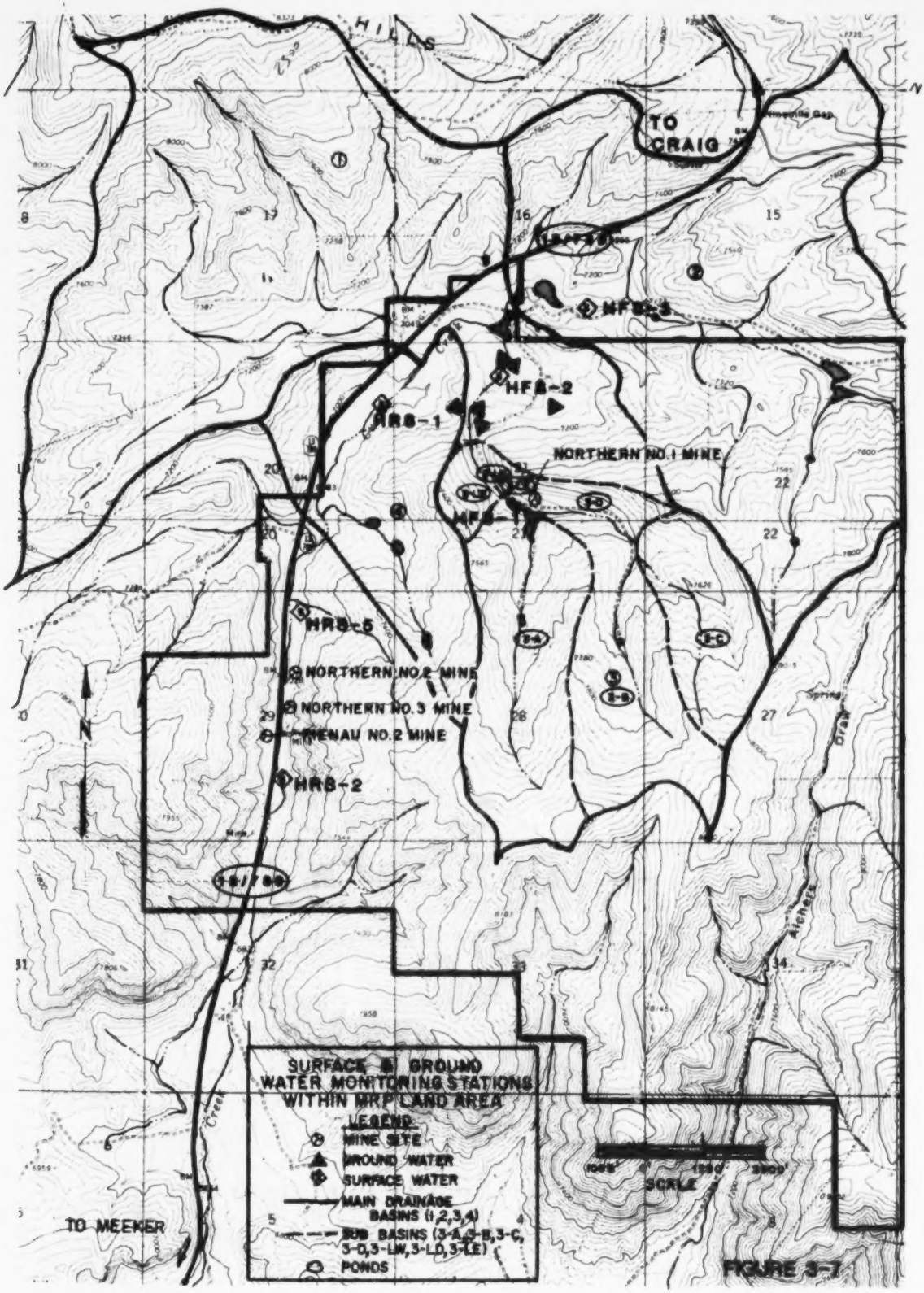

TO CRAIG
HFS-3
HFS-2
HFS-1
HRS-1
NORTHERN NO.1 MINE
HRS-5
NORTHERN NO.2 MINE
NORTHERN NO.3 MINE
TENAU NO.2 MINE
HRS-2
N
TO MEEKER
SURFACE & GROUND WATER MONITORING STATIONS WITHIN MRP LAND AREA
LEGEND
MINE SITE
GROUND WATER
SURFACE WATER
MAIN DRAINAGE BASINS (1,2,3,4)
SUB BASINS (3-A,3-B,3-C, 3-D,3-LW,3-LD,3-LE)
PONDS
SCALE
Spring Draw
Aichele

FIGURE 3-7

Table 3-1.--Full suite water quality parameters[a]

General characteristics	Major ions
Temperature (°C)	Calcium
Dissolved oxygen	Magnesium
Conductance (umhos/cm^3)	Potassium
pH, field (units)	Sodium
pH, lab (units)	Carbonate
Alkalinity ($CaCO_3$ eq)	Bicarbonate
Hardness ($CaCO_3$ eq)	Chloride
Dissolved solids, total	Sulfate
Suspended solids, total	Sulfide
	SAR (units)

Nutrients	Trace metals
Ammonia	Boron
Nitrate	Copper
Phosphate	Chromium
	Iron, total
	Iron, dissolved
	Lithium
	Manganese
	Mercury (ug/L)
	Molybdenum
	Magnesium
	Zinc

[a]All parameters are measured in milligrams per liter (mg/L) unless otherwise noted.

By combining all the monitoring that has been done, NCC concludes that conductivity values increase downstream, along with sodium absorption ratio (SAR) values. The pH values also generally increase downstream, with an average of 8.2 at the HFS-3 station and 8.4 at HRS-2. There is a general trend toward an increasing TDS concentration downstream.

Curtis Creek can generally be described as a sodium bicarbonate type stream with the tributary stations indicative of a calcium bicarbonate type stream. Most of the constituents of Curtis Creek fall within the allowable effluent limitations set by OSM for Fe, Mn, TSS, and pH. However, on four occasions to date, the TSS concentration of 45 mg/L was exceeded with values of 90, 118, 54, and 105 mg/L.

According to the information submitted by NCC in the MRP, there are three major active surface-water rights on Curtis Creek. These are the Nine Mile irrigation system, the Sheridan No. 3 Ditch, and the Proctor Reservoir. The Aichers Gulch surface-water rights presently being used are for the Mary Murray and Bar-Seven Ditches. Legally, there are other filings within the area, but many of the users have converted to dry-land farming, owing to the commonly experienced scarcities for the lower priority rights.

In all, there are 13 adjudicated surface rights in the Curtis Creek drainage and four adjudicated rights in Aichers Gulch.

NCC has filed applications to store water in two reservoirs, Jensen No. 2 and Jensen No. 3.

The Nine Mile Ranch system irrigates approximately 80 acres in the northern part of the Curtis Creek watershed. This irrigation system is inactive at present. The Proctor Reservoir system irrigates 100 acres in the Curtis Creek watershed below the Rienau No. 2 mine, although most of this land was dry-land farmed in 1979. The Sheridan No. 3 Ditch irrigates 160 acres in the southern portion of the Curtis Creek watershed, with additional rights possible through filings that have not been adjudicated.

GROUND-WATER HYDROLOGY

From a regional standpoint, the only laterally persistent aquifer system in the Meeker area mines land area is contained within the Trout Creek Sandstone (top of the Iles Formation). This formation is approximately 75 to 90 feet thick and is composed of predominantly medium-grained quartz feldspathic sandstone, locally interbedded with brackish-water shale and siltstone.

Ground water in the vicinity of the Meeker area mines land area occurs in two principal water-bearing zones. These zones, or aquifers, include the alluvial deposits of Curtis Creek and the undifferentiated sandstone, shale, and coal seams of the Williams Fork Formation. Three monitoring wells constructed in the alluvial sediments of Curtis Creek indicate that these materials consist almost entirely of silty clay and thin discontinuous layers of clinker gravel up to 0.5 inch in diameter (fig. 3-7). Both permeabilities and yields of water wells drilled in the alluvial deposits are very low. Test well HRA-1, completed in the Curtis Creek alluvium, showed a permeability of 111.6 gallons per day per square foot and a pumping rate of only 17 gallons per minute. Recharge to the alluvial sediments occurs by both infiltration of precipitation and underflow from the Williams Fork Formation. In the Curtis Creek alluvium, annual recharge has been estimated to be about 123 acre-feet per year. Ground water in the Curtis Creek alluvium is generally of the sodium bicarbonate type with TDS ranging from about 585 to 1,000 mg/L. Alluvial waters generally exhibit pH values of 7.8 to 8.2 and alkalinities of 400 to 640 mg/L.

The second water-bearing zone in the mine plan area occurs in the Williams Fork Formation. Because of the nature of the undifferentiated sandstone and other low-permeability stratigraphic units within the Williams Fork Formation, this water bearing zone is not considered to be a laterally persistent, or continuous, aquifer system. Monitoring wells constructed in the overburden and underburden indicate that the coal seams are hydraulically isolated from the overburden and surface alluvium. Permeabilities of the coal seams and overburden lithologies are generally very low. Reported well yields of the eight wells completed within the Williams Fork Formation within a 6-mile radius of the MRP land area are less than 10 gallons per minute.

Site-specific aquifer characteristics of the Williams Fork Formation were determined by pumping and recovery tests in the overburden and individual coal seams proposed for mining. Aquifer testing on the sandstones overlying the G seam indicate they have a composite transmissivity of about 1,500 gallons per day per

foot and a permeability of only 4.3 gallons per day per square foot. Permeabilities measured in the coal seams were generally greater than those measured in either the underburden or overburden materials. However, permeabilities of all coal seams were less than 20 gallons per day per square foot, which is very low. The highest permeabilities were found in the FF coal seam and averaged about 7 gallons per day per square foot.

Ground-water recharge to the Williams Fork Formation is dependent upon deep percolation of precipitation from a probable recharge area north of the MRP land area in the vicinity of the Danforth Hills anticline and along the steeply southward-dipping north limb of the Sulphur Creek syncline. Potentiometric surfaces of the confined ground water in the coal seams and overburden indicate a general flow pattern from north to south through the MRP land area.

The quality of water sampled from the five coal seams and the overburden material shows a wide variability in chemical makeup and ranges in TDS from 200 to 8,000 mg/L. Water sampled from the G coal seam shows a calcium hydroxide type water with TDS averaging about 3,000 mg/L and a strong alkalinity with pH of 12.2. In contrast, water from the J, the Upper P, and P seams shows a sodium bicarbonate type water with TDS concentrations ranging from about 400 to 800 mg/L and a slight alkaline nature with pH of 8.5. Samples obtained from the FF coal seam generally exhibit higher dissolved solids with TDS values ranging from about 600 to 2,000 mg/L and are generally of the sodium bicarbonate type.

Ground-water use within the general area surrounding the Meeker area mines is very limited. The Colorado State Engineer's Office lists 17 registered wells within a 6-mile radius of the project center. Of these 17 wells, only 8 wells are reported to be completed in the Williams Fork Formation. The total yield of these eight wells is estimated to be only 100 gallons per minute.

ALLUVIAL VALLEY FLOORS

Three drainages in the Meeker area mines mine plan area and adjacent area were considered as potential alluvial valley floors. These drainages include Curtis Creek, the FF tributary, and Aichers Draw. For the purposes of delineating the presence or absence of alluvial valley floors in these areas, these drainages were broken down into upper and lower Curtis Creek, the Curtis Creek Narrows, upper and lower Aichers Draw, and the Aichers Draw Narrows. (See figure 1 in "Alluvial Valley Floor Study for the Meeker Area Mines, Northern Coal Company, 1981.")

The identification of alluvial valley floors along these stream reaches was based on geomorphic and water availability characteristics, agricultural practices, and the identification criteria provided in the rules and regulations of CMLRD and the Alluvial Valley Floor Guidelines of OSM. On the basis of geomorphic characteristics and the alluvial valley floor identification criteria, the Curtis Creek Narrows, upper Aichers Draw, and the Aichers Draw Narrows do not qualify as alluvial valley floors because of limited channel and valley size. However, upper and lower Curtis Creek, the FF tributary, and lower Aichers Draw have sufficient unconsolidated streamland deposits, terraces (and/or flood plains), and channel and valley size to meet the alluvial valley floor criteria from a geomorphic standpoint. In terms of water availability to support agricultural activities, parts of Curtis Creek, the FF tributary, and the lower Aichers Draw are presently flood irrigated. Lower Curtis Creek was flood irrigated in the past and, therefore, has the potential

for flood irrigation. In addition, portions of upper Curtis Creek and the FF tributary are subirrigated. With respect to agricultural practices in the valleys associated with the Meeker area mines, basic agricultural uses include livestock grazing and hay and wheat production. For example, hay is grown in the meadows of upper Curtis Creek and the lower reaches of the FF tributary, whereas dryland wheat farming is currently practiced in areas of lower Curtis Creek and lower Aichers Draw.

Therefore, on the basis of geomorphic and water-availability characteristics, agricultural practices, and the alluvial valley floor identification criteria included in the rules and regulations of OSM alluvial valley floor guidelines, the following areas associated with the Meeker area mines have been identified as alluvial valley floors: upper and lower Curtis Creek, the FF tributary, and lower Aichers Draw.

CLIMATE

The regional climate in the vicinity of the study area is characterized by adundant sunshine, low precipitation, and low relative humidity. Controlling factors having the greatest influence on the regional climate include elevation and topography. Maximum temperatures during the summer may reach 100°F, whereas temperatures may drop to -40°F (U.S. National Weather Service, 1969). With an increase in elevation comes a corresponding decrease in temperature, at a rate of 3.5°F per 1,000 feet. Therefore, the higher elevations characteristically have comparatively cool summer temperatures and occasional very low winter minima. Accordingly, the number of frost-free days will vary from as few as 50 days in the higher elevations to as many as 180 days in the lower elevations (U.S. Department of Interior, 1973). Because of the irregular topography, local conditions have a marked influence on the cold season temperatures. The mountainous region to the east of the study area all but precludes the invasion of continental polar air from the northern plains; therefore, major cold waves and high winds are not common.

Precipitation, too, is strongly influenced by changes in elevation associated with topographic barriers. As an air mass is forced to rise, as when crossing a mountainous region, it is cooled at the adiabatic lapse rate. If cooling is sufficient, precipitation will result, allowing for very steep gradients of both rainfall and snowfall with elevation. However, topography is also responsible for the relatively low precipitation amounts received in western Colorado as a whole (8 inches in the drier, low-lying areas, to 20 inches in the mountains surrounding the study area). Maritime polar air masses, moving with the prevailing winds, are forced to flow over the Pacific Northwest and are largely dried out prior to reaching western Colorado, producing a rain shadow effect. During the summer months the intense heating of the region produces frequent afternoon thundershowers, but total rainfall is light.

In winter a further factor contributing to the low precipitation is the anti-cyclonic circulation common to the area which, with its slowly subsiding motion of air, produces dry air masses. According to the U.S. National Weather Service (1969), average annual precipitation in the vicinity of the study area is 16.2 inches per year. In 1979, only 12.41 inches were recorded at the Meeker reporting station. The mean number of days annually that precipitation is greater than or equal to 0.1 inches is 38.7. Snowfall is greater than or equal to 1.5 inches 15.6 days annually (U.S. National Weather service, 1969).

The study area lies within the Eleventh Colorado Air Quality Maintenance Area (AQMA) and, more precisely, within the Curtis Creek airshed. Local climatic conditions in the Curtis Creek airshed are strongly influenced by four factors: slope, aspect, elevation, and vegetation. Mountain and valley winds are common, as differential heating caused by various combinations of the previously mentioned factors establishes a circulation pattern whereby the wind flows upslope (up Curtis Creek Canyon) during the day and downslope at night. Wind speed and direction data collected at meteorological monitoring stations located at the northern and southeastern parts of Curtis Creek Canyon indicate that the prevailing wind direction is from the north through the canyon and from the northwest as the canyon opens through Meeker. Wind speeds will vary with the time of day and the location within the canyon but average between 4 and 12 knots a large percentage of the time.

Maximum, minimum, and average temperatures for the study area are 5° to 10° lower than temperatures recorded at Meeker, owing mainly to the difference in elevation between the two meteorological monitoring station sites. The average annual temperature for Meeker is 43°F, with January and July monthly average temperatures being 21°F and 66°F, respectively. The record minimum temperature of -43°F occurred in January and the record maximum temperature of 103°F occurred in July. The mean number of days per year the temperature is greater than or equal to 90°F is 14.3, and the mean number of days per year the temperature is less than or equal to 32°F is 210.3 (U.S. National Weather Service, 1969).

AIR QUALITY

Air quality and meteorological monitoring equipment was installed in December 1977 and January 1978 at sites located in Curtis Creek Canyon. Meteorological stations include the No. 1 North and No. 2 South Met stations. These stations are located at the northern and southeastern parts of Curtis Creek Canyon, respectively. The No. 1 North Met station is still in operation; no data has been collected at the No. 2 South Met station since July 1979. Meteorological parameters measured include wind speed and direction, temperature, and precipitation. Air quality stations measuring total suspended particulates (TSP) include the No. 1 North Hi-Vol and No. 2 South Hi-Vol stations. The No. 1 North Hi-Vol station is located at the same site as the No. 1 North Met station. The No. 2 South Hi-Vol station is located to the south of the No. 1 North Hi-Vol station and to the northwest of the No. 2 South Met station.

Applicable Federal secondary and State TSP air quality standards for the study area are shown in table 3-2. TSP data collected in 1979 and 1980 at the No. 1 North Hi-Vol and No. 2 South Hi-Vol stations are presented in table 3-3.

The 1979 data presented indicate high 24-hour concentrations occurred at both Hi-Vol sites during that year. The high 24-hour concentrations were primarily during September and October; the concentrations were higher at the No. 2 South Hi-Vol station. September and October probably were months when the agricultural land just south of the No. 2 Hi-Vol station was being cultivated during a comparatively strong northerly wind, which would impact the Hi-Vol at the time. In comparison, there were only 2 days in 1979 at the North Hi-Vol that exceeded the standard. On both days, winds exceeded 30 miles per hour at the site. It is an

accepted procedure to discount data if the winds exceeded 30 miles per hour during the time the sample was collected.

Table 3-2.--Air quality standards for TSP

Average time	Federal secondary standard	State standard
Maximum 24 hour	150 $\mu g/m^3$	150 $\mu g/m^3$
Annual geometric mean	60 $\mu g/m^3$	60 $\mu g/m^3$

Table 3-3.--TSP data for No. 1 North Hi-Vol and No. 2 South Hi-Vol stations

Station	Year	Annual geometric mean	Highest 24-hour concentration
No. 1 North Hi-Vol	1979	21 $\mu g/m^3$	171 $\mu g/m^3$
No. 2 South Hi-Vol	1979	41 $\mu g/m^3$	348 $\mu g/m^3$
No. 1 North Hi-Vol	1980	34 $\mu g/m^3$	202 $\mu g/m^3$
No. 2 South Hi-Vol	1980	38 $\mu g/m^3$	144 $\mu g/m^3$

In 1980 each site exceeded the standard only once. This was after extensive rework by NCC on its facilities under a new air quality permit with the State of Colorado and with minimal activity in the area. Each site is allowed in the standards to have one violation annually. Therefore, the two sites did not exceed the air quality standards in 1980. Examination of the data for the year 1980 indicates that the violations were isolated; therefore, it could have been the strong winds in the area which increased the TSP concentrations to that level.

The company has installed better dust-control systems and a coal-loading facility at the Rienau No. 2 mine. This was done after receiving an air quality permit issued by the State of Colorado, Department of Health, Air Quality Division. At present, NCC has a final air quality permit for these facilities.

VEGETATION

The area of the Intermountain West in which the study area occurs is dominated by mountain mahogany-oak shrub communities. This area is also commonly referred to as the mountain and plateau life zone.

The five vegetation community types occurring within the MRP land area area listed below in order of their decreasing areal extent.

- Big sagebrush community
- Mountain shrub community
- Aspen forest community
- Meadow community
- Pinyon-juniper woodland community

Three of these vegetation types would be affected by the proposed action. Potential disturbance would occur in the big sagebrush community, the mountain shrub community, and the meadow community. The acreage of these affected vegetation communities for the MRP land area and the portion of this area to be disturbed are summarized in table 3-4. The location and the distribution of all vegetation communities within the MRP land area are shown in figure 3-8. Vegetation communities within PRLA C-0126997 and the 600 acres of unleased land are shown in figure 3-9. No threatened or endangered species have been found within the study area.

Table 3-4.--Acreage for vegetation community types on the proposed MRP land and affected areas

Plant community type	MRP land area (acres)	Affected area (acres)
Big sagebrush community	551	50
Mountain shrub community	361	27
Aspen woodland community	212	0
Meadow community	175	41
Pinyon-juniper woodland community	40	0
Disturbed and developed areas	23	23
Total	1,362	141

Two of the three vegetation community types to be disturbed by the proposed action are dominated by shrub species: Big sagebrush and Mountain shrub communities. The remaining community is the "meadow" type that is dominated by grasses, grasslike species, and forbs. Shrub species are infrequent in this Meadow community.

The big sagebrush community has a relatively open shrub canopy, whereas the mountain shrub community is dominated by serviceberry. Snowberry is a codominant species but less prevalent than serviceberry. The canopy of this type is

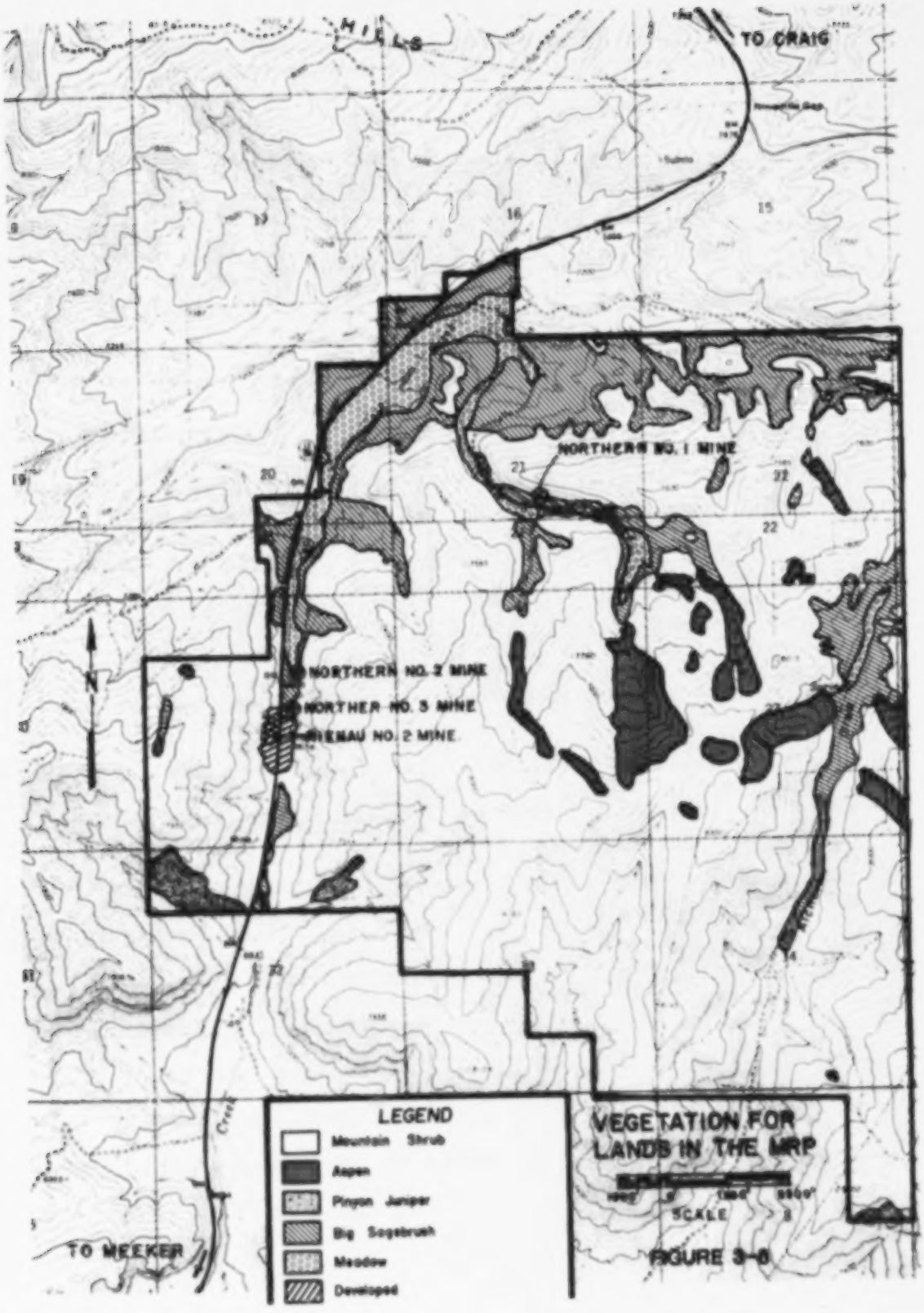
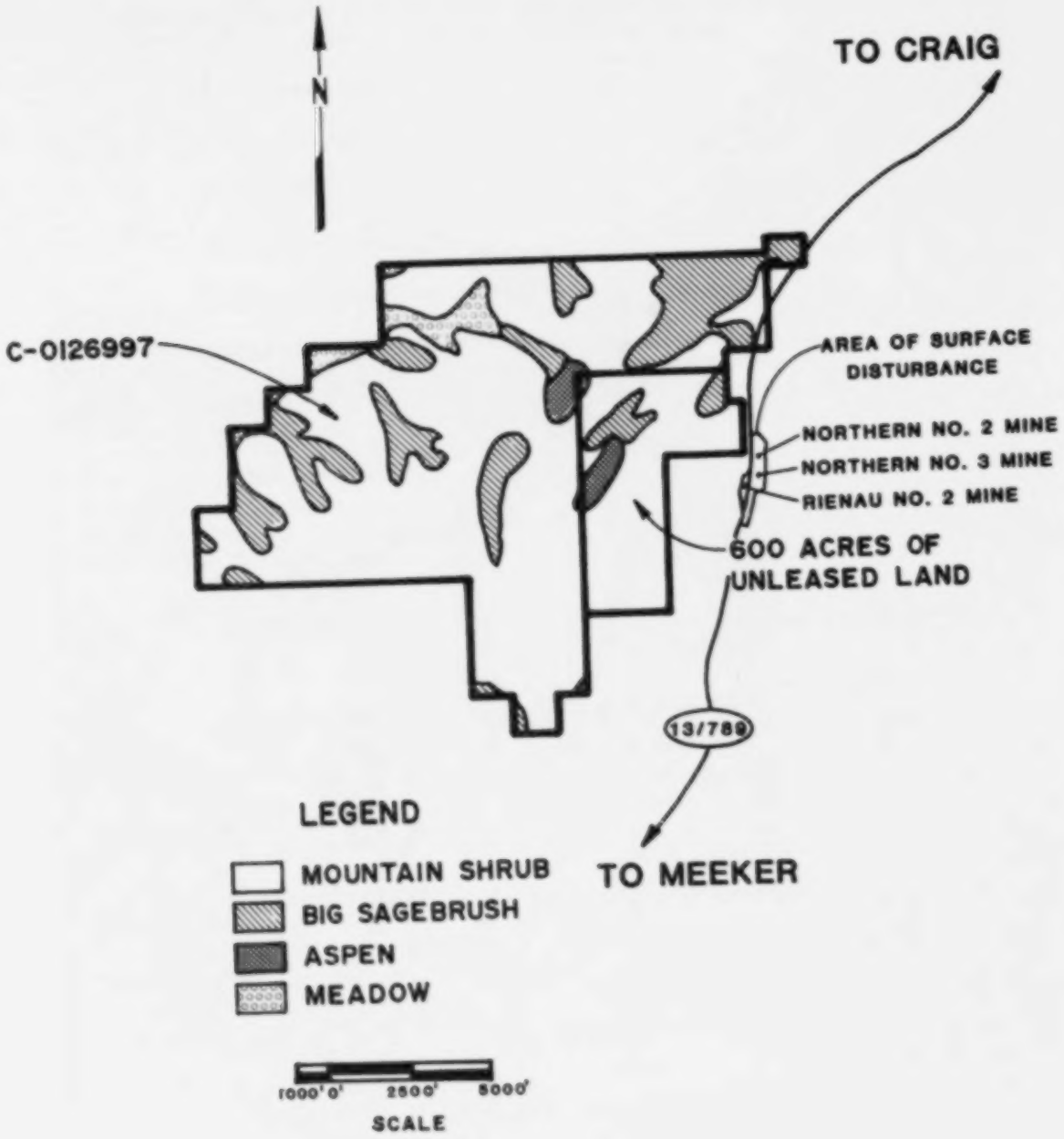

TO CRAIG
NORTHERN NO. 1 MINE
NORTHERN NO. 2 MINE
NORTHER NO. 3 MINE
N
TO MEEKER
LEGEND
Mountain Shrub
Aspen
Pinyon Juniper
Big Sagebrush
Meadow
Developed
VEGETATION FOR
LANDS IN THE MRP
SCALE

FIGURE 3-6



VEGETATION FOR PRLA C-0126997 AND UNLEASED LAND

FIGURE 3-9

relatively closed. Shrub cover is the greatest in this type. A summary of vegetation cover, shrub density and height, and production for affected communities is provided in table 3-5.

Table 3-5.--Summary of cover, density, production, and diversity values for affected vegetation communities

Vegetation community type	Graminoid cover (percent)	Forb cover (percent)	Shrub cover (percent)	Average shrub density/ acre[a]	Production (gm/m^2)
Big sagebrush	21.2	29.0	15.0	6,069/35	147.0
Mountain shrub	11.9	12.0	41.2	8,391/48	102.7
Meadow	73.1	25.1	0.1	59/20	299.9

[a]Average shrub density per acre is measured as number of shrubs over average shrub height in feet.

The herb layer of each of the three affected plant community types is dominated by cool season grasses. These species are mid-grasses in the meadow type. The most important of these graminoids common to the three affected vegetation types are native bluegrass, western wheatgrass, and various sedges. Cover by graminoids is greatest in the meadow community and least in the mountain shrub community (table 3-5).

Forbs account for approximately 25 percent of the total vegetation cover in the meadow and big sagebrush communities. The less developed herb layer underlying the relatively closed canopy of the mountain shrub community supports a forb cover of approximately 10 percent.

The meadow community has the highest productivity of the affected vegetation types (300 gm/m^2). The mountain shrub community has the lowest productivity (103 gm/m^2) (table 3-5).

Diversity of the premining area has been calculated from data supplied in the MRP. Importance values derived from diversity calculations show the following species to be of primary importance on the pre-mining area:

- Western wheatgrass
- Native bluegrass
- Canada bluegrass
- Needle-and-thread grass
- Pacific aster

- Mountain lupine
- Big sagebrush
- Snowberry

Two vegetation community types occur in the areas of the Wilson-Loudy and Milk Creek loadouts. Well-drained upland soils support communities dominated by big sagebrush. Poorly drained lowland areas characterized by saline and alkaline conditions are dominated by greasewood.

LAND USE

The primary land uses in the study area are grazing, wildlife habitat, agriculture, and coal mining utility and transportation corridors.

Annual production of forage and browse on the MRP land area ranges from 2,709 lb/acre to 96 lb/acre. Carrying capacity for this area ranges from 1.5 animal unit months/acre (AUM's) to 0.4 AUM's (table 3-6).

Table 3-6.--Productivity of land within MRP land area, 1979 data

	Mean productivity (lb/acre)	Animal unit months/acre
Meadow community	2,709	1.5
Big sagebrush community	1,328	0.6
Mountain shrub community	926	0.4

The study area under consideration is capable of supporting existing uses. Crop production on a small scale is also possible but is economically limited by the short growing season.

The MRP land area has been zoned agricultural by Rio Blanco County.

Soil units occurring in the MRP land area were mapped in accordance with a Soil Conservation Service (SCS) Intensity III Survey for Rio Blanco County. This survey was upgraded to SCS intensity I though additional field mapping. The nearest agricultural activity is approximately 2.9 miles south of the study area.

With respect to alluvial valley floors, it has been noted previously that the basic agricultural uses of these valleys include livestock grazing and hay and wheat production. For example, hay is grown in upper Curtis Creek with one cutting per year. Hay yield in this area averages 50 to 60 tons per year and hay production is limited in some areas of upper Curtis Creek due to extremely boggy conditions; however, approximately 60 to 70 acres is suitable for hay production. Historically, the meadows of upper Curtis Creek area have been grazed in the spring after

snowmelt until late June or early July, at which time livestock were moved to summer range. Livestock were normally returned to the area in September to graze until the onset of winter. Generally, sheep were run on Curtis Creek, although cows were run on the meadows occasionally. In the past, the upper Curtis Creek meadows have been used for both calving and lambing.

Hay is also cut on the lower portions of the FF tributary (immediately upstream from the Jensen No. 1 Reservoir) and along lower Curtis Creek approximately 2.5 miles downstream from the Rienau No. 2 mine. Approximately 4 acres and 80 acres of hay are cut in these two areas, respectively. A number of ranchers in the area have converted grazing areas in these valleys to dryland wheat because of deteriorating range conditions and water-rights limitations. For example, dryland wheat farming is currently practiced in the lower Curtis Creek area immediately below Proctor Reservoir, and in lower Aichers Draw.

With respect to the significance of farming on the identified alluvial valley floors to farming operations in the area, the agricultural production from alluvial valley floors (in terms of usable forage per acre per year and animal unit months) was compared to the total production from each ranching unit in the area which includes these alluvial valley floors. In all cases, the alluvial valley floors associated with the Meeker area mines provide a very small percentage (i.e., less than 6 percent) of the forage and carrying capacity of the ranching units in the area and are, therefore, not significant to local farming operations.

WILDLIFE

The study area encompasses a variety of wildlife habitats characteristic of mountainous areas found in northwestern Colorado. The primary habitats are the riparian habitat along Curtis Creek, mountain meadow, sagebrush, and mountain shrub/aspen areas. The riparian habitat lies within a canyon with western and eastern exposures and includes some stock ponds which provide additional watering areas for wildlife. The riparian area ranges in elevation from 6,800 feet to 7,050 feet. The mountain meadow habitat has gentle slopes with mainly southern exposure and is located adjacent to and above the riparian areas. The sagebrush habitat occurs on gentle slopes mainly at intermediate elevations within the study area. The mountain shrub/aspen habitat has moderate slopes reaching elevations of 8,200 feet with mainly northern exposures.

No threatened or endangered species have been observed to live within the study area. NCC has provided descriptions of Federal and State listed threatened or endangered species known to inhabit northwestern Colorado in the MRP. These species are listed in table 3-7.

There is no current evidence that the black-footed ferret exists in Colorado. The wolverine has been observed in Utah habitat similar to the study area, but no strong evidence of this carnivore's presence has been found in northwestern Colorado. The river otter may exist in the White River where some essential habitat requirements are met, but no confirmed sightings have been made within the last 30 years. The study area does not meet the habitat requirements of the lynx. However, this State-listed endangered species does occur in north-central and central Colorado, east of the study area.

Table 3-7.--Threatened or endangered species of wildlife known to inhabit northwestern Colorado

Common name	Scientific name	Federal list	State list
Black-footed ferret	Mustela nigripes	E	E
Wolverine	Gulo gulo	---	E
River otter	Lutra canadensis	---	E
Lynx	Lynx canadensis	---	E
Bald eagle	Haliaeetus leucocephalus	E	E
Peregrine falcon	Falco peregrinus anatum	E	E
Whooping crane	Grus americana	E	E
Greater sandhill crane	Grus canadensis tabida	---	E
Colorado River cutthroat trout	Salmo clarki pleuriticus	---	T
Razorback sucker	Xyrauchen texanus	---	T
Bonytail chub	Gila elegans	---	E
Colorado squawfish	Ptychocheilus lucius	E	E

T = Threatened; E = Endangered.

The White River and its tributaries, including Curtis Creek, have suitable hunting and nesting habitat for the peregrine falcon. However, no peregrine falcons have been found in area cliffs, and none have been observed in the area for many years. The whooping crane and greater sandhill crane have migrated over the study area, but any presence of these species at the minesites would be unlikely.

The Colorado River cutthroat trout is not found within the reaches of the White River influenced by Curtis Creek, and neither stream meets the habitat requirements of this species. The razorback sucker has not been observed in the White River drainage but does live in several other Colorado rivers. The White River itself does have suitable habitat for the razorback sucker. The bonytail chub is currently found only in the Green River in Utah. However, the White River does meet the habitat requirements of this species. The Colorado squawfish has been found in the White River and generally prefers larger rivers rather than tributaries.

Bald eagles are found along the White River within 8 miles of the study area. The White River riparian woodlands supply a prime wintering habitat for bald eagles, and they have also been observed wintering at the mouth of Curtis Creek Canyon below the Rienau No. 2 mine portal. These bald eagles feed primarily on fish, waterfowl, and carrion. Bald eagles have been observed to soar, presumably

during hunting, over the study area. Two letters addressing the bald eagle with respect to the Meeker area mines are included in the MRP. The first letter from the U.S. Fish and Wildlife Service (USFWS) (dated April 12, 1979) states that the bald eagle activity within the MRP land area is limited to soaring and that further consultation on the matter is unnecessary. The second letter from the BLM (dated April 12, 1979) states that the steep topography and dense vegetation of the MRP land area does not provide optimum hunting habitat for bald eagles and that the mining activities would not adversely impact this species.

There are eight red-tailed hawk nests and four golden eagle nests situated within the study area, none of which occur within the area of surface disturbance. Of the four golden eagle nests, three lie within the MRP land area, and one lies less than 200 feet outside the MRP land area boundary. The nests occur among cliffs west of State Highway 13/798. Figure 3-10 shows eagle nest buffer zones within and adjacent to PRLA C-126997 and the 600 acres of unleased land. The eagles are considered permanent residents, along with red-tailed hawks that also nest in the MRP land area. Golden eagles and red-tailed hawks construct or return to traditional nest sites early in February to lay their eggs sometime in March or April. Nest occupation continues until chicks are fledged from mid-May to late July, depending upon when nesting activities began.

NCC has observed 14 economically valuable wildlife species living within the MRP land and proposed Milk Creek rail loadout areas. These species are listed in table 3-8.

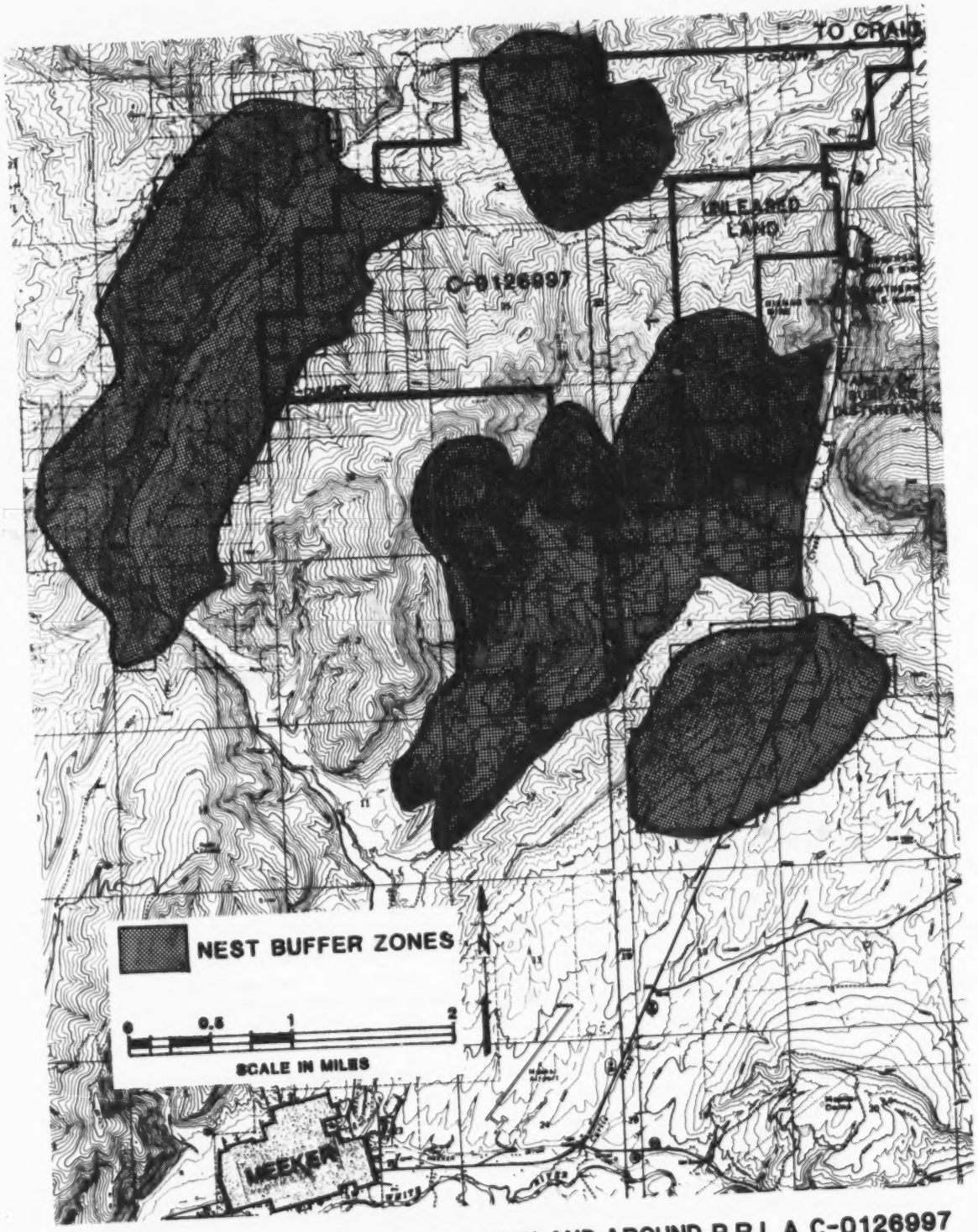
The study area receives a high hunting and recreation use because of its location within the Colorado Division of Wildlife (CDW) Game Management Unit No. 23. The game species listed in table 3-8 vary in numbers throughout the MRP land area. Species of primary concern include the American elk of the White River Elk Herd, mule deer, pronghorn antelope, and sage grouse.

American Elk

The White River Elk Herd has been described by the CDW as "the most important in the State." For this reason, an intensive 5-year investigation of this herd was made between 1961 and 1966 (Boyd, 1970). Consequently, the information base relative to elk in the study area is considerably better than average. Boyd (1970) described the herd as "probably the largest and most valuable in Colorado." Although elk numbers have varied considerably over past decades, they appear to be on the increase in recent years as compared to deer, and the general statement of significance is still appropriate according to the field personnel of CDW contacted during this project.

"Rocky Mountain elk, a subspecies of American elk, occur in large numbers in only six or seven States with the largest herds occurring in Wyoming, Montana, Colorado, and Idaho. Since the White River Elk Herd is Colorado's largest and most valuable * * *" (Boyd, 1970), it is concluded that it is one of the most valuable herds of Rocky Mountain elk in the Nation. Two other subspecies of American elk, Tule and Roosevelt, occur in smaller numbers, so the White River Elk Herd should be considered highly significant as a national biological and recreational resource.

In a regional context, both deer and elk migrate during the fall from higher areas in the Flattops Wilderness, east of the study area, in a westward direction toward the minesites and Curtis Creek, and northwest toward the Piceance



EAGLE NEST BUFFER ZONES WITHIN AND AROUND P R L A C-0126997
AND UNLEASED LAND AREA
FIGURE 3-10

Table 3-8.--Economically valuable species of wildlife observed within the MRP land and proposed Milk Creek rail loadout areas

Common name	Scientific name	Observed within MRP land area	Observed within proposed Milk Creek loadout area
American elk	Cervus canadenis	X	X
Mule deer	Odocoileus hemionous	X	X
Pronghorn antelope	Antilocapra americana	X	X
Cougar	Felis concolor	X	X
Black bear	Ursus americanus	X	X
Coyote	Canis latrans	X	X
Beaver	Castor canadensis	X	X
Muskrat	Ondatra zibethica	X	X
Nuttal's cottontail	Sylvilagus nutallii	X	X
Snowshoe hare	Lepus americanus	X	X
Sage grouse	Centrocercus urophasianus	---	X
Blue grouse	Dendrapagus obscurus	X	X
Mallard	Anas playrhynchos	X	X
Green-winged teal	Anas crecca	X	X

Triangle. (See figure 3-11.) The winter range for these animals extends from just north of Meeker northward to the Axial Basin and east from State Highway 13/789. The summer range, migration routes, and winter range for both deer and elk are shown in figure 3-11. During two migratory seasons (April to May and October to November), the CDW reports that up to 800 elk migrate between the higher summer range and the winter range. This is along a heavily traveled east-west transition route from Sleepy Cat Peak to Nine Mile Gap. (See figure 3-11.) Elk generally migrate along the higher ridge lines, whereas deer move lower in the valleys and along the sideslopes. Elk tend to move both north and south from their main migration route. According to CDW field personnel, a large percentage of them winter in the Nine Mile Gap area. The migration route, particularly in the Nine Mile Gap area, is, in effect, a constricted habitat corridor for both elk habitation and movement. The area also accesses remaining winter ranges west of State Highway 13/789. According to Ed Hollowed (BLM wildlife biologist, oral communication, March, 1981), nearby areas such as Axial Basin to the north and Rattlesnake Mesa/White River valley to the south may not provide the vegetative characteristics and topographic features necessary for the same degree of secure elk movement, cover, and forage, as does the Nine Mile Gap crossing.

According to Boyd (1970), approximately 65 percent of the White River Elk Herd winter on the main White River and its tributaries, which comprise only 18 percent of the total winter range available to the herd. The total winter range for the herd is very extensive and is broken into eight CDW Game Management Units in the Yampa, Colorado, Williams Fork, and White River drainages. Boyd's study focused on units 23 and 24. Unit 23 includes the MRP land area and a considerable area to the south of Meeker. Unit 24 generally contains the higher summer range country to the east, including the Flattops Wilderness.

The primary elk winter range in the vicinity of the study area, shown in figure 3-11, is generally bounded by State Highway 13/789 to the west, Coal Creek to the southeast, and Milk Creek to the northeast. A relatively high percentage of the winter range is considered critical due to intrinsic qualities, such as vegetative composition, and physical characteristics, such as slope, aspect, and elevation. These areas are interspersed throughout the winter range. They allow extended later winter use of high-quality forage and cover resources which are keys to herd survival throughout the most crucial late winter and early spring periods in severe winter years. One such area of note, according to NCC, is the proposed waste disposal site, where approximately 25 elk are reported to have wintered in 1979-80.

The winter range shown in figure 3-11 is known as the Yellowjacket Subunit of the main White River Elk Herd. This subunit is contained within the CDW Data Analysis Unit (DAU) E-6. According to Ed Hollowed (oral communication, March 1982), DAU E-6 makes up about 5 percent of Colorado's elk production area but yields over 15 percent of the State's total elk population (20,500 to 130,000 elk). Total population of the main White River Elk Herd is about 8,000 elk. Hollowed also stated that the Yellowjacket Subunit winters up to approximately 2,500 elk, or 30 percent of the entire White River Elk Herd. The portion of the subunit involving James Creek and Nine Mile Gap is reported by Hollowed to winter about 20 percent of the entire White River Elk Herd (1,000 to 1,500 elk).

Mule Deer

Mule deer in the area northeast of Meeker generally move in the same migratory direction as elk, from the eastern high country to the west and toward

DEER AND ELK SUMMER/WINTER RANGE AND MIGRATION ROUTES

FIGURE 3-11

the Piceance Triangle. Deer, however, as compared to elk, tend to use the lower elevations for migration and to move more toward the south and into the Curtis Creek basin. Many deer cross State Highway 13/789 in the 6- to 10-mile stretch north of Meeker and move on toward the Piceance Triangle. In general, the deer tend to inhabit the lower areas and are more inclined to move across State Highway 13/789.

Pronghorn Antelope

Antelope are not considered a highly significant species within the study area. Approximately 30 antelope were observed in the location of the proposed Milk Creek rail loadout during the 1980-81 winter. According to William Clark (CDW, oral communication, March 1981), this is a small, relatively isolated herd that frequents the proposed Milk Creek rail loadout area. Recent observations of this area indicate an increase in pronghorn antelope use over that observed in previous years.

Sage Grouse

Sage grouse are the most common species of upland game bird inhabiting the proposed Milk Creek rail loadout area. In the MRP, NCC discusses the grouses' distribution. habitat, and strutting grounds. In the spring, the grouse use strutting grounds located in open grassy meadows and on sagebrush ridges. NCC has identified three strutting grounds, two about 1.5 miles west of the proposed Milk Creek rail loadout area, and the other about 1 mile from the Wilson-Loudy rail loadout.

Special Value Habitats

Habitats of special value include the following:

- Important wildlife migration routes are shown in figure 3-11. Large mammals including elk and deer enter the MRP land area and migrate north and south along Curtis Creek and State Highway 13/789. In addition, elk and deer migration occurs into areas west of State Highway 13/789.

- In the MRP, NCC has identified elk preferred use areas and elk movements through them. These preferred use areas provide optimum habitat for elk wintering areas.

- All riparian, wet meadow, and aquatic habitats (beaver and stock ponds, springs, etc.) are of concern, particularly those habitats located along Curtis Creek. Their spatial distribution likely determines or influences the potential availability and utility of big game and livestock ranges from April to October, particularly during migration periods.

- The cliff and aspen habitats located in the adjacent area west of State Highway 13/789 support nests for golden eagles (see appendix D), and red-tailed hawks nests, respectively.

- The sage grouse strutting grounds and nearby nesting, brooding, and wintering areas of the sage grouse located in the vicinity of the proposed Milk Creek loadout area are of concern because they are critical to the birds' survival.

SOCIOECONOMICS

The information presented in the socioeconomic sections of chapters 3 and 4 of this EIS is taken from several sources including: (1) "Socioeconomic Assessment for the Meeker Area Mines," Denver Research Institute, 1981; (2) "Socioeconomic Characterization of Northwest Colorado," Fred C. Hart Associates, 1981; and (3) Green River-Hams Fork EIS, U.S. Department of the Interior, Bureau of Land Management, 1980.

Approximately 73 percent of the population related to the expansion of the Meeker area mines is expected to reside in Rio Blanco County; therefore, the county, the town of Meeker, School District RE-1, and several special service districts are considered the local governments that would be primarily impacted by approval and implementation of the proposed action. The remaining population (27 percent) is projected to be distributed between Garfield (10 percent), Moffat (16 percent), and Routt and Mesa Counties (1 percent) and will not have a significant impact on these entities.

Rio Blanco County is one of four counties in northwestern Colorado that is experiencing a wide range of changes related to the development of oil shale and other energy resources. The population of Rio Blanco County has increased 76 percent during the past 11 years, from 4,842 in 1970 to an estimated 8,531 in 1981. Meeker's population increased approximately 86 percent, from 1,579 in 1970 to an estimated 2,951 in 1981. The bulk of energy-related growth, however, was foreseen to occur in the 1980's. In July 1980, the Colorado West Area Council of Governments (CWACOG) released population projections based on the "most likely" future of energy development in the region (Scenario II, table 3-9). The population of Meeker was projected to increase from 2,356 in 1980 to 10,013 in 1990, a 325 percent increase. Rio Blanco County's population was projected to increase 221 percent from 6,255 in 1980 to 20,094 by 1990. These baseline projections exclude the Meeker area mines and account for Rio Blanco Oil Shale Company's (RBOSC) recent cutback from 363 to 45 employees.

Over the past year, economic changes have increased the uncertainties of energy-related growth in the county. RBOSC has postponed any commercial decisions until 1985; the Cathedral Bluffs operation announced its intentions to reduce its workforce from 363 to 30 by September 1982; and the Multi-Mineral Corporation has postponed its development plans indefinitely. For this reason, the socioeconomic assessment presented in this EIS represents a "worst case" situation; that is, it is acknowledged that energy development will occur in the region, but at a slower pace than was originally projected.

Rio Blanco County is typical of rural areas in the West that are experiencing shifts in employment sources due to energy development. Agricultural employment accounted for 15.5 percent of total employment in 1973, dropping to 11.1 percent in 1978. Mining employment has increased 104 percent to 21.1 percent of total employment in 1978. Due to increased energy-related job opportunities, the county's 1981 unemployment rate was 3.3 percent, well below the State's 1981 rate

of 5.5 percent. In January 1982, the county's unemployment rate rose to 5.3 percent, reflecting the current slowdown in the energy industry.

Table 3-9.--Colorado West Area Council of Governments
Scenario II population projections

(The energy company workforce projections which were utilized in the preparation of Scenario II population projections include companies with expansion and/or development plans. Note that the baseline projections on the preceeding page exclude Northern Coal and hold RBOSC constant at 45 employees)

C-a Rio Blanco Oil Shale Project (Gulf and Standard)
C-b Cathedral Bluffs Shale Oil Company (Occidental and Tenneco)

Colony Oil Shale Project (ARCO/Exxon and Tosco)
Union Oil Shale Project

Superior Oil Shale and Minerals Project
Snow Mass/Anschutz Coal

Colowyo Coal
Northern Minerals Coal

New Coal (leasing and expansions as proposed as part of BLM's Green River-Hams Fork EIS)
Ancillary Basic Response Development in Mesa County

Colorado Ute Powerplant
Utah International

GEX/CMC Coal
Sheridan Coal

Energy Fuels
Mid-Continent Mesa II

Moon Lake (Powerplant and Coal)
Storm King

Personal income from agriculture in the county has continually decreased, whereas personal income from mining has more than doubled from $13 million in 1978 to $31.8 million in 1979. Construction income during the same years rose from $3.8 million to $4.1 million (Bureau of Economic Analysis, Regional Economic Information System). These figures represent the importance of mining to the county's economy. Upcoming trends are highly dependent upon the future of energy development in the region.

The number of dwelling units in Rio Blanco County increased 35 percent between 1970 and 1980, from 1,881 to 2,541. There were approximately 980 housing units in Meeker in 1980, the majority being single-family homes. There are

three mobile home parks in Meeker, each having 20 pads. Although vacancy rates in multifamily units were less than 1 percent in 1981, the availability of units has steadily increased during the first quarter of 1982.

There is no shortage of available building spaces in the Meeker area; therefore, numerous subdivision developments are planned to meet future housing demands. In 1981, 2,673 single-family lots, 999 mobile home pads, and 2,823 multifamily and apartment units were planned for the area. The largest proposed subdivision is a planned 5,534-unit development known as "Meeker Terrace." This development would consist of 2,212 single-family homes, 2,725 multifamily units, and 596 mobile home spaces, potentially housing up to 16,000 people. In February 1982, the Meeker Town Council accepted the developer's request for annexation into Meeker. The council is also considering plans to move the Meeker Airport in order to accommodate the Meeker Terrace proposal.

High interest rates exacerbate the problem of finding affordable housing in Meeker. The 1981 average price for a single-family unit in Meeker was $64,000, which required a combined income of $23,000 to $25,000 annually to finance a $50,000 mortgage. Currently, the county is seeking to develop a $15 million low-interest (14 percent) mortgage bond program to help make housing more affordable. The overall shortage of low-priced housing, such as mobile homes and apartments, may be Meeker's major housing problem in upcoming years.

Most municipal services in Meeker and the county are either growing or need to be expanded in response to increased population. Many public facilities are at or nearing capacity. Funds are being sought from the Oil Shale Trust Funds (OSTF) for a Cooperative Community Facilities Project intended to accomplish the following by 1984:

- Convert the City Hall into office space for the fire district and add two bays to the Fire Hall for housing new fire equipment (near completion).

- Make a comprehensive, community-wide study of existing public facilities, determine overall needs, and develop an integrated plan for new construction/conversion or replacement, including maximum joint usage (under way).

- Remodel the courthouse/jail facility and complete site improvements on the new county/town complex.

The ultimate overall cost for this project is estimated at approximately $6 million. A total of $376,000 has been received from OSTF funds for the initial phases of expanding fire service space and for making the comprehensive public facility study.

The police department is adequately serving the existing Meeker population but will have to continually expand to serve the baseline population. The county's most pressing need is for a larger jail, as the existing facility has been outgrown. The Rio Blanco Fire Protection District and Meeker Volunteer Fire Department utilize volunteer firefighters. The town does not own any fire equipment; the county recently obtained funds for a new pumper and an increase in administrative and equipment space.

The Pioneer Hospital in Meeker serves the present population within a 20-mile radius of the town. Services currently are reported as adequate, although plans for long-range expansion or construction of a new hospital are being made in anticipation of population growth.

School District RE-1, headquartered in Meeker, serves all of eastern Rio Blanco County. The district is operating under the principle that no "excess capacity" exists and that on-going improvements must be made to meet growth demands. The most pressing needs are for new kindergarten and elementary school facilities, estimated to cost almost $4 million, not including land.

The street system in and around Meeker is reported to be in good condition; however, annual expenditures of $250,000 have been projected for upgrading and maintaining these roads. Developers are responsible for construction of new streets in their subdivisions. The town has a master storm drainage plan and is making storm sewage improvements. The Meeker water system's present capacity will serve 4,000 people. The town is expanding this capacity to serve 7,500 to 8,000 people, largely with OSTF monies. The town will have to obtain a larger water supply in the near future to meet demands.

The Meeker Sanitation District is able to serve 4,000 people. Funding has been secured mainly from the OSTF to expand this capacity to serve 8,000 people by 1983. The county's solid waste facility, which also serves the town of Meeker, will be adequate for the next 16 to 17 years.

In addition to property taxes, the major sources of revenues for the county, the school district, and Meeker, particularly for capital improvements, are the Oil Shale Trust Fund, impact grants from the State, the Federal Lease and Severance Tax Fund, the Federal 601 Program, and the recently passed countywide sales and use tax. Between 1974 and 1980, the county received over $7.8 million from the OSTF, and Meeker has received over $6.8 million for assistance in preparing for oil-shale-related growth. In 1981, Rio Blanco County received $16.7 million, or 35 percent, of the $47.6 million principal remaining in the OSTF. This near-final distribution to all counties will not be drawn on until actually needed, although Colorado legislature is considering legislation which would enable counties to set up special accounts to receive impact trust fund distributions, earn interest, and dispense funds themselves according to need and local priorities.

Human services in Meeker are provided primarily by the County Social Services Department. Their current staff of 3.5 FTE (full-time equivalent) is adequate to meet the needs of Meeker residents. Family care services dealing with child abuse, foster child placement, and family crises are cited as the most pressing need for future expansion. In 1981, a Human Resources Council was organized to help establish priorities and direction for delivery of human service needs.

Recreation facilities in Meeker are inadequate to meet existing needs. A recreation district was formed in 1981, although securing adequate funding for improvements outlined in the county's Recreation Master Plan may still be difficult. Recreational activities for women are a major concern of local officials.

The sociocultural environment of Meeker has traditionally been one of a small homogeneous ranching community. The town has experienced some of the sociological changes often associated with rapid growth: increases in the number

of reported crimes, perceived differences in attitudes and values of newcomers versus those of long-time residents, and increased need for mental health and social services.

Several studies and surveys have been made in the Meeker area to monitor attitudes toward energy-related growth, the most recent being "Quality of Life, Expectations of Change, and Planning for the Future in an Energy Production Community," University of Colorado, 1982. This study documents that residents are generally cautious of the growth stimulated by energy development, yet they desire a healthy and growing economy for Meeker. The most prevalent attitude is that the local community should not have to pay for the costs of growth associated with energy production. Attitudes may change toward the energy industry and its related growth as a result of the recent curtailment in employment and job opportunities.

TRANSPORTATION

State Highway 13/789 connects Interstate 70 at Rifle, Colorado, with U.S. Highway 40 at Craig, Colorado, and provides direct access to the study area. Traffic on State Highway 13/789 is moderate, averaging about 200 vehicles per peak-hour in 1980. This is expected to increase to about 623 vehicles per peak hour in 1996, the year of estimated peak mine production. Several secondary roads traverse the areas surrounding the minesites.

The level of service rating for State Highway 13/789 near the study area is "C." This level of service rating denotes any of an infinite number of different combinations of operating conditions that can occur in a given lane or roadway when it is accommodating various traffic volumes. In particular, level of service "C" is indicative of stable traffic flow when vehicles operate at speeds of 40 mph or above for uninterrupted flow on a two-lane highway. This level of service also indicates a total volume for both directions of travel reaching 70-percent capacity with continuous passing sight distance.

The results of a traffic count study estimated that the segment of State Highway 13/789 between the study area and the proposed Milk Creek rail loadout area would reach capacity by 1984.

The major railroad in the area is the Denver & Rio Grande Western Railroad (D&RGW), which runs from Craig, Colorado, via Bond, Colorado, to Denver, Colorado. The line between Craig and Bond currently has 4 trains per day, and the line between Bond and Denver has 17 trains per day. The nominal capacity of the line is 48 trains per day. The major constraint on the line's capacity is the Moffat Tunnel, which is located between Bond and Denver.

Presently, a 5-mile spur track connects the Wilson-Loudy rail loadout to the D&RGW at Craig. An addition to this spur track is planned to connect with the proposed Milk Creek rail loadout to the south.

The nearest scheduled air service is located at Rifle, Colorado, approximately 38 miles northeast of the study area.

For PRLA's C-0126997 and C-0126999, the existing road network consists of only a limited amount of trails. The proposed road construction within these areas would consist of access roads to ventilation shafts.

RECREATION

Recreation opportunities within the vicinity of the study area include outdoor resources and indoor facilities. Outdoor recreation resources are located throughout the region in rural and urban areas within and adjacent to the study area. Rural recreation opportunities include hunting, fishing, wildlife photography, sightseeing, off-road vehicles (ORV) use, snowmobiling, cross-country skiing, and utilization of National Forest lands.

Hunting of all game species, especially big game, is a predominant form of rural outdoor recreation. Deer and elk are intensively hunted in the study area during a 2- to 3-week season each fall. Hunting in the study area is primarily controlled by the private sector, as out-of-State hunters pay landowners for the right to hunt big game on private lands. Fishing in the study area is best along the White River. Wildlife photography and sightseeing is most prevalent along State Highway 13/789. ORV recreation is a secondary use commonly associated with other rural recreation opportunities such as hunting and fishing. Snowmobiling and cross-country skiing are popular winter sports on both private and National Forest lands. The northwest corner of the White River National Forest is located about 7 miles east of PRLA C-0126999. Recreation opportunities in the National Forest include hiking, camping, and winter sports. Both indoor and outdoor recreational facilities in Meeker are inadequate to meet the needs of the existing population.

CULTURAL RESOURCES

Cultural resource on the MRP land and proposed Milk Creek rail loadout areas were inventoried by personnel of Centuries Research, Inc. (Baker and Wood, 1978; Stevens 1980), Metcalf-Zier Archaeologists, Inc. (Bradley, 1980), and Pioneer Archaeological Consultants (Henss and Anderson, 1979; Noisat, 1980) as shown in figure 3-12. Study areas in some cases exceeded the boundary of the MRP land area with several sites recorded in these outside study areas. Sixteen cultural resources were recorded within the MRP land area. These resources include four sites, seven localities, and five isolated finds. The inventory for the proposed Milk Creek rail loadout area recorded 6 isolated finds and 5 sites, 4 of which were discovered by a previous survey. Both historic and prehistoric aboriginal materials are represented. Historic resources include ranch and homestead structures; dumps and isolated finds of historic debris; and carved graffitti on standing aspen trees. Aboriginal resources include open campsites, restricted lithic scatters, and isolated artifacts. One site displayed both historic Euroamerican and aboriginal debris.

A small portion of PRLA C-0126997 received a Class III inventory for cultural resources by Pioneer Archaeological Consultants (Henss and Anderson, 1979). One prehistoric site and two isolated finds were recorded within the PRLA boundary. PRLA C-0126999 also received a complete Class III inventory for cultural resources by Pioneer Archaeological Consultants (Henss and Anderson, 1979). In addition to the sites recorded within the MRP land area, two historic carved aspen tree sites were recorded. The National Register of Historic Places (NRHP) eligibility status of all resources is is shown in tables 3-10, 3-11, 3-12, and 3-13:

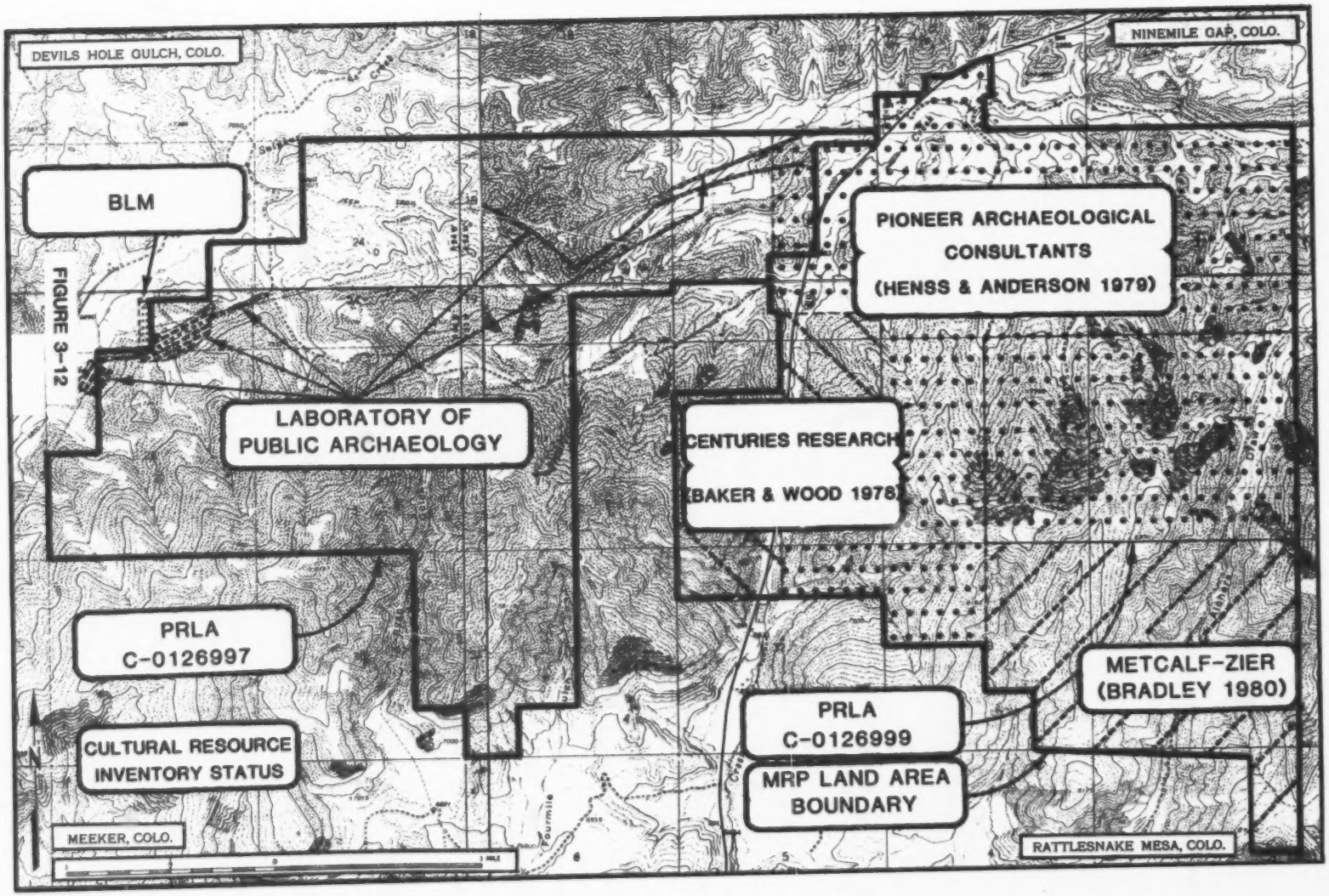

DEVILS HOLE GULCH, COLO.
NINEMILE GAP, COLO.
BLM
PIONEER ARCHAEOLOGICAL CONSULTANTS (HENSS & ANDERSON 1979)
LABORATORY OF PUBLIC ARCHAEOLOGY
CENTURIES RESEARCH (BAKER & WOOD 1978)
PRLA C-0126997
METCALF-ZIER (BRADLEY 1980)
PRLA C-0126999
MRP LAND AREA BOUNDARY
CULTURAL RESOURCE INVENTORY STATUS
MEEKER, COLO.
RATTLESNAKE MESA, COLO.
N

FIGURE 3-12

Table 3-10.--MRP sites[a]

Type of site	Prehistoric	Historic	Multicomponent
Ineligible	5RB1225 5RB1226 5RB1227 5RB1231 B&WIF[b]	5RB1223 5RB1228 5RB1240 5RB1241 5RB1243 5RB932	5RB1237

[a]Excludes Sites Within PRLA C-0126999.
[b]Baker and Wood, 1978. No number was assigned to this isolate.

Table 3-11.--Sites in the proposed Milk Creek rail loadout area

Type of site	Prehistoric	Historic
Eligibility unknown	5MF656	5MF426 5MF427 5MF428 5MF429
Ineligible	N.C.M.C. IF 1[a] N.C.M.C. IF 2 N.C.M.C. IF 3 N.C.M.C. IF 4 N.C.M.C. IF 5 N.C.M.C. IF 6	

[a]Stevens, 1980. Isolates were numbered as follows: N.C.M.C. (Northern Coal Milk Creek) IF 1 through IF 6.

Table 3-12.--PRLA C-0126997 sites

Type of site	Prehistoric
Eligibility unknown	5RB1224
Ineligible	5RB1230 5RB1238

Table 3-13.--PRLA C-0126999 sites

Type of site	Prehistoric	Historic	Multicomponent
Eligible	5RB1219		
Ineligible	5RB1233 5RB1234	5RB1239 5RB1242	5RB1218

One prehistoric site (5RB1219) is eligible and one other site (5RB1224) may be eligible for inclusion on the National Register of Historic Places (NRHP). Four prehistoric sites (5MF656, 5MF427, 5MF428, 5MF429) and one historic site (5MF426) may also be eligible.

The cultural resource inventory of the study area is highly diverse, including historic homesteads (5MF426, 5RB932, 5RB1218, 5RB1242, and 5RB1223), historic localities of carved aspen trees (5RB1239, 5RB1240, 5RB1241, 5RB1243), a multi-component lithic and historic artifact site (5RB1237), aboriginal campsites (5RB1219, 5RB1224, 5RB1233), lithic scatters (5RB1227, 5RB1231, 5RB1234, 5MF656, 5MF427, 5MF428, 5MF429), and isolated finds, both historic (5RB1228) and prehistoric (5RB1225, 5RB1226, 5RB1230, 5RB1238, B&WIF, N.C.M.C. IF 1 through IF 6 inclusive).

Site 5RB1219 is a Fremont Culture campsite located on a knoll-crest along a north/south oriented ridge. The material assemblage includes lithic debitage, a projectile point, and pottery sherds. The locality exhibits potential for buried material, as most finds were observed in bladed roadcuts. The site was assessed as eligible for the NRHP by the recording consultants (Henss and Anderson, 1979).

Site 5RB1224 is an aboriginal campsite on a ridge, with potential for buried deposits. It was assessed as requiring further data for eligibility evaluation (Henss and Anderson, 1979).

Sites 5MF427, 5MF428, 5MF429, and 5MF656 were recorded by Stevens (1980) in the course of a survey within the proposed Milk Creek rail loadout area. All are prehistoric lithic scatters, probably multicomponent short-term base camps dating to the Middle Archaic and Late Prehistoric to Historic Periods. Sites 5MF428 and 5MF429 were assessed as "strongly eligible," and 5MF427 as "possibly eligible" (Stevens, 1980).

Based on the resources recorded in the MRP land area, the proposed Milk Creek rail loadout area, and the two PRLA's, aboriginal occupation of the study area focused on a mixed economy of hunting and collection of wild plant resources. The eligible and potentially eligible prehistoric sites may offer data which would add to our knowledge of this subsistence strategy and its development through a sequence of aboriginal culture periods. The historic occupation of the study area centered on homesteading and small-scale ranching. The eligible and potentially eligible sites may offer data on the lifeway and economy of late 19th and early 20th century homesteading families and on reconstruction of the local and regional historic sequence.

ESTHETICS

The landscape character of the study area has low form, with steep to rolling terrain that is intersected by State Highway 13/789. Small rock outcrops add angular lines to rounded hills from observer viewpoints. Hills are intersected by drainages and are covered with mountain shrub communities and small aspen groves. Color is brown and orange in the mountain shrub areas, with the aspen groves turning yellow in the fall and silver in the winter. Texture from observer viewpoints along the highway is coarse in the foreground and medium in the middleground. Visual sensitivity ranges from high along the highway to low on existing Federal coal leases and PRLA's away from public access roads. Scenic quality is rated as characteristic of the area and the management rating under the Visual Resources Management (VRM) system is Class IV. Existing mining facilities have medium to low compatibility in form, line, and color with landscape from highway viewpoints. Texture of existing viewing facilities is coarse and has high compatibility with the landscape. State Highway 13/789 has medium line compatibility with Curtis Creek and the valley.

NOISE

The general existing noise level in the study area is approximately 50 to 55 decibels (dB). Other than that from natural occurrences, this noise is mainly caused by mining activities and heavy equipment use at the Northern No. 1 and Rienau No. 2 mines and their associated facilities. Additional noise is produced by 25-ton trucks transporting coal to the Wilson-Loudy rail loadout at a rate of approximately 100 truck trips per day for about 245 days out of the year. Other noise in the study area is produced by vehicle traffic between Craig and Meeker.

CHAPTER 4

ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes environmental impacts that are projected to occur if alternative A, the proposed action (or preferred alternative as identified in chapter 2), is approved and implemented. The issues of concern and impact analyses were mainly determined on the basis of:

- Issues and areas of concern discussed in the April 15, 1981, scoping hearing held in Meeker. (See Summary.)
- Baseline data and information provided in NCC's MRP.
- Baseline data and information provided in BLM's coal amendment to the White River Resource Area land use plan, and preliminary draft environmental assessments for PRLA's C-0126997 and C-0126999.
- Consultation with MMS, USGS, and BLM.

TOPOGRAPHY

Mining would initially be by underground room-and-pillar methods. In the future, specific areas could involve secondary and longwall mining. Approximately 140 acres of land would be disturbed, with resulting topographic changes, by the individual mine portal areas, roads, refuse disposal site, and ancillary facilities. (See appendix A.) Localized subsidence may occur as a result of mining in areas of shallow cover. Assuming that all 5 seams would be mined, maximum subsidence would most likely not exceed 11 feet in some places.

Mining operations proposed at the four underground mines would result in the generation of limited amounts of waste rock. This waste material would be deposited at a refuse disposal site located in the SW¼ sec. 20, T. 2 N., R. 93 W. The refuse disposal site has been selected by NCC to avoid interference with both surface drainage and steep natural slopes. Prior to placement of the waste-rock material, all topsoil in the refuse disposal site would be removed and stockpiled in a protected area for future reuse. The topsoil would be revegetated to reduce erosion. Diversion ditches and sedimentation ponds have been designed by the applicant and would be constructed to reduce and prevent sediment loading and adverse impacts to the flows in Curtis Creek. The final surface configuration of the waste-rock pile would blend with the existing surrounding topography.

In addition to using underground room-and-pillar methods, the proposed mining operations would include secondary and long wall mining in specific areas. Depths of the five coal seams range from about 250 feet to almost 2,500 feet below ground surface. However, the majority of mining would occur below 500 feet of overburden. Subsidence would likely occur in areas of limited cover, such as near the portals. In some areas, approximately 11 feet of subsidence is expected. The angle of draw for subsidence is projected to range between 12° and 16°. Final results of the subsidence would be a general lowering of the ground

surface, as opposed to differential collapse (some areas subsiding more than other areas). However, some fractures and cracks may occur in the transition zone from subsided to nonsubsided areas.

GEOLOGY

Because the proposed mining operations would use underground room-and-pillar techniques, changes to the study area's existing geologic features would be localized to strata in those areas impacted by subsidence. The underground room-and-pillar method of mining would result in removal of only limited amounts of overburden and waste-rock material. Mining would remove up to 12-foot thicknesses of coal from each of the five individual seams. A total of approximately 189,608,000 tons of coal would be removed during the period of mining. This would include 21,543,000 tons from the Northern No. 1 mine (FF coal seam), 37,926,000 tons from the Northern No. 2 mine (the Upper P seam and the P seam), 64,502,000 tons from the Northern No. 3 mine (J seam), and 65,637,000 tons from the Rienau No. 2 mine (G coal seam).

SOILS

Soil-forming processes would be interrupted in the 140 acres of disturbed surface during mining, resulting in changes in soil biological activities. Changes in soil productivity would be insignificant upon reclamation. The replaced topsoil would be able to support the vegetative species needed to meet planned postmining land uses. The reclaimed soils would have a different taxonomic classification as a result of having been disturbed. Thus, changes in texture, structure, and associated chemical changes would occur from the mixing of the A, B, and C horizons. These reclaimed soils would be more uniform in soil texture and thickness than the premining soils.

During construction of the haul roads, the central shop, the supply yard, and the mine portals, topsoil would be stockpiled for reclamation of these areas upon completion of mining. This stockpiled soil would undergo the greatest change with respect to biota. The numbers and species may decrease, but since the upper portion of the stockpile would be vegetated, this soil zone would serve as inoculum when the soil is replaced. Resulting impacts would be insignificant, as the area to be disturbed is relatively small.

Total productivity of the disturbed area should not be altered significantly, although on a microscale, changes would occur because of the following:

- Soil materials rated "good" may be mixed with those rated "fair." This would result in a more uniform texture and would tend to average out the extremes in productivity of the contrasting soils.

- The topsoil thickness would be more uniform, especially at the refuse disposal site, where soil from the A, B, and C horizons would be mixed together.

- Plant nutrient levels would change as a result of long storage and mixing of soil horizons. However, this impact would be minimized by the addition of fertilizers to replenish lost nutrients.

- Erodibility of the soils may be increased due to mixing soil from the heavier textured B horizon with the surface, or A horizon. The soil structure would change as the result of disturbance. However, soil losses would be minimal, and, to some degree, changes resulting from erosion may be compensated for by an increased soil thickness.

HYDROLOGY

Mining would create relatively insignificant short-term adverse impacts to the hydrologic system in both quantity and quality of surface- and ground-water supplies. Long-term hydrologic conditions during and following mining would tend to return to premining conditions.

During mining, surface- and ground-water characteristics and sediment discharge would be modified in the disturbed areas. Sedimentation ponds have been designed by NCC to prevent discharges of sediment-laden water into Curtis Creek. These ponds have been designed to handle storm events up to 25-year, 24-hour-duration storms. Ground-water levels in the sandstone aquifers of the Williams Fork Formation would be lowered slightly within the study area. However, effects from mining operations on ground-water levels are not anticipated to extend beyond about 4,500 feet from the mined coal seams. NCC has calculated maximum ground-water inflow conditions (with all five coal seams being mined) to be about 2,000 acre-feet per year. This quantity of inflow represents only 0.3 percent of the total estimated ground-water storage in the mine area and only 0.08 percent of the total estimated ground-water storage within the general region.

Surface-Water Hydrology

Due to a lack of flow and water-quality data before 1977 in the upper Curtis Creek drainage and the absence of data for the Sulphur Creek drainage, the analysis of hydrologic impacts is primarily qualitative. No dependable estimate of impacts can be made for the PRLA area within the Sulphur Creek drainage owing to this lack of data. For the Curtis Creek and Aichers Draw areas, some quantification can be made.

Some minor dewatering of the alluvial valley floor and, consequently, of Curtis Creek, Aichers Draw, Ryan Gulch, and Sulphur Creek is projected to occur. NCC estimates that this loss for Curtis Creek will be approximately 27 acre-feet during a year similar to 1979. This is approximately 20 percent of normal summer base flow conditions. However, it must be emphasized that this worst-case estimate is based on very limited data. It is estimated that simlar losses could occur for the other streams. Principal causes of the surface water loss include infiltration into the ground through subsidence cracks in overburden formations; increases in the presently limited vertical permeability of local rock formations due to underground excavations; and reduction in surface water recharge from shallow aquifers due also to the increased vertical permeability of the local formations. To mitigate any problems that might be created by this flow depletion, NCC has filed a plan in the Colorado State courts to augment water supplies in the event that losses occur.

As with flow depletion and water rights, the determination of water-quality impacts on a quantitative basis is not possible with any degree of certainty. Throughout the period of mining, Curtis Creek will be impacted by mine-water

discharges. These will vary over time as mining of the various seams change in terms of relative importance. For example, the anticipated flow increase in Curtis Creek due to the addition of FF-seam and G-seam mine water is estimated at 0.75 cubic feet per second (cfs). J-seam water will bring the total flow increase to 0.8 cfs. After the P Seam water is considered, the total flow increase is estimated to be 1.46 cfs. Much of this water originated in the Curtis Creek alluvium and other aquifers within the area before entering the mine, it is uncertain just what the net effect will be. However, it is certain that the timing of flow and the water quality constituents would be affected by stream and alluvium (and other aquifer) dewatering and its flow through the mine before discharging back into Curtis Creek.

NCC has proposed the construction of settling ponds immediately downstream from the disturbed areas. These ponds have been designed with capacities to contain a 25-year, 24-hour storm event, in addition to dead-storage capacity for sediment accumulation. NCC's MRP discusses realignment of Curtis Creek and the diversion of storm runoff from side drainages which would otherwise move into the mining areas. The new reach of Curtis Creek flows through a pipe with an inlet capacity designed for a 25-year, 1-hour storm event and the adjoining channel and flood-plain regions are adequate to pass a peak runoff from at least a 100-year event.

NCC's National Pollutant Discharge Elimination System (NPDES) permit limits the discharge of certain pollutants. For pH, the maximum value allowed by the NPDES permit is 9.0. The current Curtis Creek pH ranges from 7.8 to 8.5, so the allowable increase in this parameter is small. The NPDES permit also states that TSS of any of the waters that will be discharged from the mine retention ponds must be less than 70 mg/L maximum and less than 35 mg/L average. At the applicant's HRS-2 monitoring station during low-flow conditions in 1980, the TSS was approximately 15 mg/L, and the average at this site during high flows was approximately 127 mg/L. NCC estimates that the mean TSS for Northern No. 1 mine effluent is 33 mg/L. TSS is therefore expected to increase over the 1980 low-flow average. During high flows, however, the mine water is expected to have a reverse effect and lower the TSS value in Curtis Creek. Although TSS impacts are anticipated, they do not appear to be significant.

The water-quality impacts of mining activity on TDS will vary over time, primarily depending on meteorologic and hydrologic conditions and the status of mining relative to the various seams. NCC estimates that the maximum anticipated increase as a result of dewatering in TDS values of Curtis Creek water leaving the MRP land area would occur when only the FF- and G-seam mines are on-line and are discharging at their maximum calculated rates during the low-flow period. When the better quality J- and P-seam mine waters are introduced into the stream system, TDS increases would be expected to be less. (See figure 4-1.) The TDS concentrations would consist primarily of dissolved sodium, calcium, potassium, sulfate, bicarbonate, carbonate, chloride, hydroxide, magnesium, and iron.

The impact on downstream water users of these changes in water quality is not clear. NCC states that the waters near the mines are presently unsuitable for long-term irrigation in the mine area or between the Rienau No. 2 mine and its confluence with the White River because of high SAR levels.

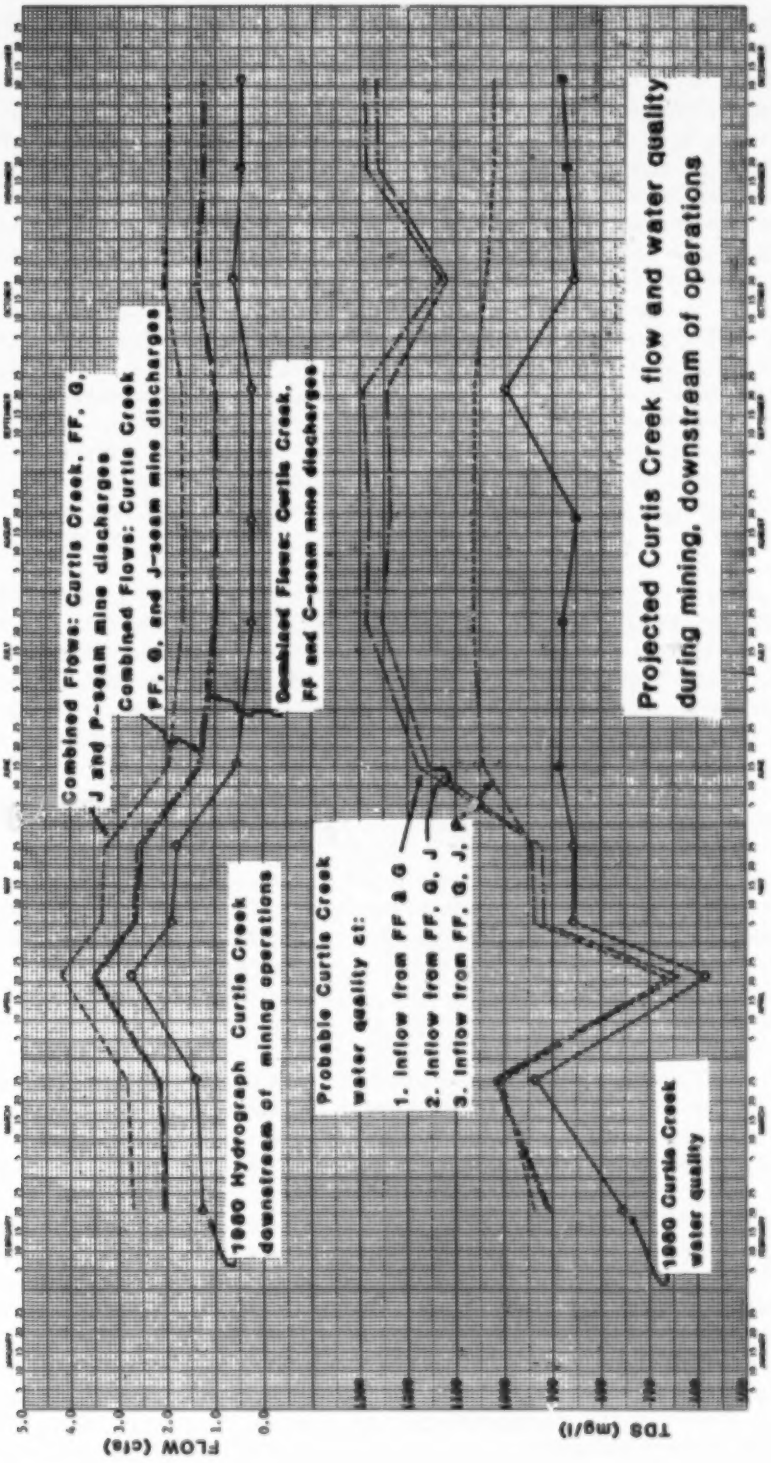

Projected Curtis Creek flow and water quality during mining, downstream of operations
1980 Hydrograph Curtis Creek downstream of mining operations
Combined Flows: Curtis Creek, FF, G, J and P-seam mine discharges
Combined Flows: Curtis Creek FF, G, and J-seam mine discharges
Combined Flows: Curtis Creek, FF and C-seam mine discharges
Probable Curtis Creek water quality at:
1. Inflow from FF & G
2. Inflow from FF, G, J
3. Inflow from FF, G, J, P
1980 Curtis Creek water quality
FLOW (cfs)
TDS (mg/l)

FIGURE 4-1

It is estimated that Curtis Creek streamflows will be depleted by approximately 0.038 cfs during mining and for some period of time afterwards. This depletion is estimated to lessen with time after mining and tend toward a premining equilibrium. It is also expected that water quality after mining is completed will tend toward the premining conditions. However, due to the increase in subsurface exposure of minerals to water, the levels of most water-quality constituents would still be expected to be above premining levels. Based on the information available, water quantity and quality impacts in Curtis Creek would be minimal and would not significantly affect downstream water users, particularly after mining and reclamation.

Ground-Water Hydrology

The availability of ground-water resources in the Williams Fork Formation is limited, and as a result, ground-water usage in the study area is correspondingly limited. Test data show that wells completed in the Williams Fork Formation generally yield less than 10 gallons per minute and exhibit widely varying water-quality characteristics, with TDS ranging from 200 to 8,000 mg/L and averaging about 1,000 mg/L.

The removal of approximately 189 million tons of coal would cause fractures in the sandstone overburden, which would induce ground water to flow into the mined out coal seams, thus partially dewatering the sandstones and shales overlying the seams. On the basis of aquifer testing, it is estimated that the maximum mine-water inflow, when all five seams are being mined, would be about 2,000 acre-feet per year. During the initial and postmining stages, mine-water inflow rates would be considerably less.

The coal aquifer tests indicate that the coal and sandstone have limited ability to transmit water and that there is virtually no vertical hydraulic interconnection between the individual coal seams. Mining would create interconnections between the overlying sandstone material and the coal seams. Thus, drawdown would spread out in the sandstone and coal seams but would be limited to the aquifers interconnected by fracturing. As a result, drawdown would be limited in both vertical and lateral extent. The lateral extent of drawdown is estimated to be about 4,500 feet.

The G coal seam, the lowest coal that would be mined, is stratigraphically 500 feet above the top of the Trout Creek Sandstone. Since the stratigraphic separation is so great, no impact on the hydrologic conditions of the Trout Creek Sandstone are expected to result from the proposed mining operations.

Ground-water storage within the study area has been estimated to be about 985,000 acre-feet. At maximum mine-water inflow conditions, annual losses of ground water from storage will be about 2,000 acre-feet, or only about 0.3 percent of total storage within the study area. From a regional standpoint, the loss of ground water and storage would amount to only 0.08 percent. The removal of coal and associated fracturing of sandstone overburden would ultimately result in an increase of available ground-water storage following completion of mining.

Because mining would interrupt ground-water flow in the coal seams and sandstone overburden, depletions of Curtis Creek streamflow could occur. Depletions may occur in two ways: (1) ground-water discharges to Curtis Creek would be reduced due to mine-water inflow, and (2) creek flow would infiltrate

into mined coal seams. The streamflow depletion could occur at locations where the coal seams subcrop beneath the valley of Curtis Creek. Maximum streamflow depletion would occur when all coal seams are being mined and the coal seams are dewatered beneath Curtis Creek alluvium. The applicant has estimated the maximum stream depletion to be 24,390 gallon per day or about 27.1 acre-feet per year. This represents a 20 percent reduction in the 1979 summer base flow of Curtis Creek. During postmining phases, as the coal seams fill with water, streamflow would return to normal baseline conditions. Similar reductions for the other streams in the mine area will probably also occur.

Water-quality changes would probably occur as a result of mining at the Meeker area mines, but studies indicate the changes may be insignificant. Because of the wide range of water chemistry between the seams to be mined, mining would bring about a blend of water quality whose chemical characteristics would be similar to the normal water quality of Curtis Creek at surface-water monitoring station HRS-2. The chemistry of this water suggests that it is usually within the guidelines for effluent limitations. In any event, all discharges to Curtis Creek streamflow would be monitored and treated according to the conditions of the applicant's NPDES permit.

ALLUVIAL VALLEY FLOORS

As noted in chapter 3, the alluvial valley floors associated with the Meeker area mines are not significant to local farming operations. Therefore, as provided in SMCRA and the rules and regulations pertaining to the protection of alluvial valley floors, the essential hydrologic functions of these alluvial valley floors may be affected during mining; however, following mining, these hydrologic functions must be restored.

As indicated in chapter 3, the essential hydrologic functions of the upper Curtis Creek alluvial valley floor include both flood irrigation and subirrigation. Based on the mining plan for this area, the principal impact will be the location of surface facilities for the Meeker area mines in this area. The flood irrigation system will be interrupted during mining, but, with proper reclamation (e.g., topsoil salvage and replacement, grading, and revegetation) and replacement of the ditch system following mining, the capability of the flood irrigation system will be reestablished. No adverse effects to the quality of flood irrigation water for this area are expected. Subirrigation of the upper Curtis Creek alluvial valley floor is not expected to be affected by mining of the FF, G, J, and P seams in the area, the depth of the G and J seams in the area. If subirrigation was affected by mining, sufficient surface water would be available to irrigate the entire valley floor (which is the current practice). Any adverse effects on the quality of soils and alluvial ground water owing to sedimentation pond seepage in this area will be short term and can be successfully treated (e.g., through application of additional water).

The essential hydrologic functions of the FF tributary alluvial valley floor include flood irrigation, the potential for flood irrigation, and subirrigation. The currently proposed development plan for the FF seam contemplates full recovery mining to the east of the mains. The mains in their present planned location underlie parts of the alluvial valley floor that are predominantly flood irrigated. Since mining will only occur on the advance in the area of the mains (and, thus, subsidence is not expected to occur), no impact on flood irrigation agricultural

activities is expected. The area of the FF tributary which is potentially flood irrigable (i.e., the area near the Northern No. 1 mine) is largely to the west of the mains, and, therefore, it is expected that the flood irrigation potential of this portion of the FF tributary alluvial valley floor will be preserved. The full recovery area of the FF tributary seam to the east of the mains includes a very small amount of the FF tributary drainage. As a result, if subsidence were to occur, only a very small portion of the watershed would be affected and, thus, flood irrigation waters for the lower reaches of the FF tributary would be diminished slightly.

Mining of the G, J, Upper P, and P seams is planned for the FF tributary area by either long wall or complete room-and-pillar mining. Given the depth of these seams in this area, it is not known at this time whether subsidence will occur and, if it does occur, how it will manifest itself at the surface and what effects it may have. For example, surface tension cracks resulting from subsidence could possibly affect wells in the area.

The essential hydrologic functions of the lower Curtis Creek alluvial valley floor are existing flood irrigation and potential flood irrigation. Since the lower Curtis Creek area will not be directly affected by the underground mining operation, preservation of these essential hydrologic functions for this alluvial valley floor involves providing water of sufficient quantity and acceptable quality for flood irrigation agricultural activities. Surface-water flow in Curtis Creek (including the discharge of mine water to Curtis Creek during mining) should preserve these essential hydrologic functions both during and after mining. In addition, preservation of these hydrologic functions should be provided for by the Water Augmentation Plan which has been filed.

The essential hydrologic function of the lower Aichers Draw alluvial valley floor is flood irrigation. The only identified impact to lower Aichers Draw may be subsidence in the headwaters of Aichers Draw and possible subsequent reductions in flow to Aichers Draw. The extent of subsidence in this area and any related effects are currently unknown. Additioanl data on subsidence will have to be provided by NCC and will be evaluated by OSM prior to any permit approval.

AIR QUALITY

The major impacts on air quality in the study area would be from increases in TSP emissions generated from mining activities and associated vehicle traffic during the life of the mines. Table 4-1 shows that the estimated controlled TSP emissions for maximum coal production from the four mines in 1992 would be approximately 34 tons. The impacts would be localized near the minesites and that portion of State Highway 13/789 passing through the study area. The impacts would be considered insignificant for those portions of the study area far removed from the minesites because, in comparison with a surface coal mining operation, estimated concentrations of TSP emissions would not exceed Federal secondary or State standards.

VEGETATION

The principal environmental impacts on vegetation are the loss of haylands, grazing lands, and wildlife habitat on 140 acres during the life of the mines. The

Table 4-1.--Estimated controlled TSP emissions for maximum production[a]

(Data are in tons per year)

Source of emissions	Northern No. 1 mine	Northern No. 2 mine	Northern No. 3 mine	Rienau No. 2 mine
Conveyors and transfer points[b]	1.96	4.90	7.87	6.52
Crushers[c]	0.20	0.49	0.79	0.65
Load in/out[d]			0.01	0.01
Screens[e]	0.98	2.45	3.93	3.26
Total	2.94	7.84	12.60	10.44
Grand total (four mines)			33.82	

[a]Based on a total maximum production of 4,249,500 tons of coal from the four mines in 1992: Northern No. 1 mine, 392,000 tons; Northern No. 2 mine, 980,000 tons; Northern No. 3 mine, 1,543,500 tons; Rienau No. 2 mine, 1,304,000 tons. (See table A-1 in appendix A.)

[b]0.2 lb/ton at an estimated efficiency of 95 percent.

[c]0.02 lb/ton at an estimated efficiency of 95 percent.

[d]0.0002 lb/ton at an estimated efficiency of 95 percent.

[e]0.1 lb/ton at an estimated efficiency of 95 percent.

removal of this vegetation, which represents 1.5 percent of the mine area, does not conflict with current or future local land use. The reestablishment of a permanent, diverse, and productive vegetative cover has adequate potential. The reestablishment of shrub-dominated plant communities, significant to wildlife, should be accomplished within 20 to 40 years following cessation of mining. Surface erosion in most areas would not occur at levels greater than premining conditions. However, erosion on locally steep slopes must be controlled.

A total of 118 acres would be affected involving three distinct plant community types as shown in table 4-2. Impacts to vegetation in the MRP land area would start at the time mining begins. Other impacts during mining would also include possible erosion in the meadow community adjacent to Curtis Creek, possible erosion in the mountain shrub community due to slope, and the effects of dust on photosynthetic processes and transpiration rates.

Table 4-2.--Acreage and productivity of land within the MRP land area

(1979 data)

Community type	Affected acres/ percent of type	Mean productivity (lb/acres)	Animal unit months/acre
Meadow community	41/23	2,709	1.5
Big sagebrush community	50/9	1,328	0.6
Mountain shrub community	27/7	926	0.4

Postmining vegetation of the affected area would be grassland at first. Reestablishment of shrub cover to levels within 80 percent of the premining cover and density would require an extended period of time. Both the big sagebrush community and the mountain shrub community would require, at a minimum, a period of 20-40 years to reach postmining cover values even though revegetation would incorporate planting shrub species at the same density levels. This lack of cover would hinder usage of the area by small mammals (i.e., mice and other rodents). Temporary cover loss would also affect germination and establishment of shade-tolerant plant species. Species composition would also be affected with less common species taking longer to become reestablished. Diversity in these affected communities would require a substantial number of years to reach former levels. After the mining operations have ceased, vegetation production should be such to permit limited grazing during the bond liability period.

The mining would not seriously affect livestock or hay production in the study area. Long-term productivity of grazing and haylands would ostensibly return to premining levels following revegetation. Revegetated areas would be dominated by native and adapted species, as indicated by seed mixtures proposed by NCC for use. Productivity levels in revegetated areas should not differ significantly from those measured prior to mining operations. Diversity in postmining areas would be less than those measured prior to mining. This temporary lower diversity would be restored within the timeframe suggested by NCC for the restoration of woody plant cover and density.

Revegetation success could potentially be hampered by cyclic climatic conditions. Dry or droughty periods represent the greatest deterrent to reestablishment of self-perpetuating plant communities. Conversely, periods of heavy runoff, due to spring melts and summer storms, may cause significant erosion. Erosion potentials on steeper slopes within the study area would be greater than existing conditions as a result of differences in plant cover. Substantial control measures, including maintenance procedures, would be necessary to mitigate the potential erosion on revegetated areas.

LAND USE

The principal environmental impacts on land use are the loss of 140 acres of haylands, grazing lands, and wildlife habitat during the life of the mines. No significant environmental impacts are anticipated to occur on prime farmlands. For a discussion of land areas considered suitable and unsuitable for further coal development, please see appendix C.

WILDLIFE

Mining operations would impact wildlife inhabiting the study area as follows:

- The continued use of the Wilson-Loudy rail loadout (32 miles north of the minesites) would involve no additional environmental impacts other than those associated with increased truck traffic resulting from increased production.

- The proposed Milk Creek rail loadout (15 miles north of the minesites) would decrease total mileage necessary to haul the coal by trucks. This would decrease roadkill hazards to wildlife compared to that incurred by continued use of the Wilson-Loudy rail loadout. In a regional or cumulative sense, it is not possible to say whether or not overall roadkills would be expected to increase significantly in the State Highway 13/789 corridor north to the Axial basin because of the interrelationship of increased numbers of truck trips and decreased miles to be traveled to the proposed Milk Creek rail loadout. (See Transportation sections of chapters 3 and 4.)

- Construction/drilling operations or access road activity close to active nests would cause flushing, avoidance, or nervousness of adult birds. During the nesting season, these responses can lead to nest abandonment, inadvertent egg destruction, or chick loss from exposure, depending on the stage of nesting.

- On the basis of information provided in NCC's MRP, there would be a slight reduction in elk critical winter range due to the elimination of such habitat at the refuse disposal area. This is expected to result in some reduction in the number of elk unless forage enhancement efforts are highly successful. Such loss would be greater during severe winters. However, no significant impacts on the elk herd would be expected because of the decrease in winter forage.

- Mining may force deer and elk to avoid the existing Rienau No. 2 and Northern No. 1 and the proposed Nos. 2 and 3 mine areas and to use other migration routes. This is contingent upon the habitat condition and acceptability of the adjacent drainages. Depending on the extensiveness of surface disturbance from potential mining, deer and elk use of the other migration routes may be possible. However, since it is not known what factors make up an acceptable migration corridor, it is not possible to predict deer and elk acceptance of other routes.

- When considered in the overall context of existing mining operations in the area, including the Colowyo mine (see figure 1-1), it appears that significant impacts on a cumulative regional basis may occur to wide-ranging wildlife in

the region. For example, the proposed Consolidation Coal Company PRLA, which is for lands near the study area, is presently being processed for approval by BLM. This PRLA discusses areas containing elk critical winter range and elk calving grounds associated with beaver ponds, vegetation cover, and available winter forage on south-facing slopes. Other PRLA's exist for lands in the Meeker and Axial basin areas. This regional area provides some of Colorado's most important elk critical winter range, as evidenced by the disproportionate number of elk that winter there compared to the rest of the land within the general winter range of the White River Elk Herd. Thus, it is important to evaluate impacts of these actions in a cumulative context; analysis of single actions may obscure the net impacts on wildlife.

Coal lease boundaries cover most of the winter range for deer and elk in the Yellowjacket subunit (from Meeker to Axial basin) and in the more dispersed winter range west of State Highway 13/789. In addition, coal mining based on existing PRLA's and known lease arrangements, as well as exploration and development of oil and natural gas, is highly likely throughout the larger region. This means that much of the winter range of the White River Elk Herd would be extensively covered by various exploration and resource development activities.

A broader level of regional concern for elk habitat extends from Steamboat Springs in the northeast to Craig in the northwest, Rifle to the southwest, Glenwood Springs to the south, and McCoy to the southeast. This is a very large portion of northwestern Colorado and includes the Flattops Wilderness, which is the summer range of the elk herd, and the Yampa, Colorado, Williams Fork, and White River drainages. The quantitative effects of the regional mining activities in this larger area are impossible to determine.

Although the specific nature and timing of the expected impacts cannot be projected, given the existing baseline data, reductions in big game numbers, particularly elk and to some degree deer, would be expected to occur because of the following:

- An increase in roadkills due to the much higher levels of coal transport and personnel travel projected for the area.
- A potentially important reduction in areas suitable for elk calving.
- Potential interference with major migration routes for deer and elk.
- Small, gradual reductions in the elk critical winter range that would reduce their capability of surviving extreme winter conditions.

In summary, the impacts of mining on wildlife in the study area are expected to be moderately significant. However, the cumulative impacts resulting from the applicant's two PRLA's, numerous other proposed mining operations, and existing mining operations could be significant, particularly for deer and elk. These impacts concern migration between deer/elk summer and winter ranges, elk critical winter range availability, and elk calving areas.

SOCIOECONOMICS

The Meeker area mines would contribute to significant social and economic impacts to the town of Meeker and to Rio Blanco County. The expansion of the mines would be one of many proposed energy and economic changes resulting from population growth. Without the mines, the population of Rio Blanco County is projected to increase from its 1981 population of 8,531 to 20,058 in 1992; with the mines, to 21,494. This represents a 7.1 percent increase over the county's total projected population without the mines in 1992. The population in Meeker in this period is projected to increase from 2,951 to 9,983 without the mines; with the mines, to 11,419. This represents a 14.3 percent increase over Meeker's projected population without the mines in 1992.

The relative population increases attributable to the expansion of the Meeker area mines is presented in table 4-3. As was stated in chapter 3, it is acknowledged that oil shale development, the largest contributor to the county's growth, will occur, but at a slower pace than originally projected by the CWACOG.

As of March 1981, total employment at Meeker area mines was 147. Presently, employment at the mines is about 10 workers. For the purpose of this analysis, the March 1981 employment figure is used as the baseline. Although the applicant's development plans are uncertain at this time, this section describes the types of impacts that might be expected with full expansion of the Meeker area mines.

The population growth associated with the expansion of the mines will begin when a construction force of 88 people would arrive to expand NCC's facilities. Another construction workforce totaling 70 employees is expected several years later. Permanent employment is projected to slowly rise to its peak of 672 employees in 1992 as production reaches 4.3 million tons per year. The workforce size will continue at this level for approximately 29 years and then gradually decrease throughout the remainder of the project's estimated 60-year life.

NCC's total population growth expected to reside in Meeker is estimated to be 1,436 in 1992, with a direct-employment-generated population of 890 and a local service-related population of 546. (See table 4-4 for list of assumptions.) The Meeker area mines population-related growth would add approximately 277 students to School District RE-1 in 1992. This represents a 10.5 percent increase over the district's total projected 1992 enrollment without the project.

Total housing requirements in Meeker for mine-related population are 227 single-family units, 121 multifamily units, and 145 mobile homes. In addition, the initial construction workforce would require 32 "temporary" quarters, such as RV pads, motel rooms, and boardinghouses; the later workforce would require 25 of these "temporary" living spaces.

Over 5,000 housing units are planned for Meeker over the next 10 years, the majority to be contained within Meeker Terrace. These planned developments are in preliminary stages, with a growing uncertainty as to the economic stability of the housing market and potential buyers.

Table 4-3.--Demographic variables with and without the Meeker area mines

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Meeker mines direct employment:													
Construction	--	8	88	--	70	--	--	--	--	--	--	--	--
Operational	147	180	265	271	287	466	531	527	529	595	663	663	672
Total	147	188	353	271	357	466	531	527	529	595	663	663	672
Meeker population:[a]													
With Meeker mines	2,356	3,041	3,649	5,599	7,272	8,538	8,902	9,428	9,975	10,696	11,423	11,408	11,419
Without Meeker mines	--	2,951	3,306	5,260	6,874	7,665	7,853	8,393	8,933	9,474	10,013	9,998	9,983
Net[b]	--	90	343	339	398	873	1,049	1,035	1,042	1,223	1,410	1,410	1,436
NCC % of total	--	3.0	9.4	6.0	5.5	10.2	11.8	11.0	10.4	11.4	12.3	12.4	12.6
Rio Blanco County population:													
With Meeker mines	6,255	8,621	10,543	12,274	14,030	16,066	16,723	17,814	18,926	20,212	21,504	21,486	21,494
Without Meeker mines	--	8,531	10,200	11,935	13,632	15,193	15,674	16,779	17,884	18,989	20,094	20,076	20,058
Net	--	90	343	339	398	873	1,049	1,035	1,042	1,223	1,410	1,410	1,436
NCC % of total	--	1.0	3.3	2.8	2.8	5.4	6.3	5.8	5.5	6.1	6.6	6.6	6.7
Meeker incremental housing requirements:[c]													
With Meeker mines	0	257	261	724	604	423	131	200	200	260	265	207	207
Without Meeker mines	0	220	131	724	598	293	70	200	200	200	200	207	207
Net	--	36	130	0	6	130	61	0	0	60	65	0	8
NCC % of total	--	14.1	49.8	0	1	30.7	46.6	0	0	23.1	24.5	0	3.7
RE-1 School District students:[d]													
With Meeker mines	900	974	1,097	1,581	1,974	2,228	2,275	2,416	2,558	2,737	2,915	2,911	2,913
Without Meeker mines	900	956	1,031	1,515	1,987	2,060	2,073	2,216	2,358	2,501	2,643	2,636	2,636
Net	0	18	66	66	77	168	202	200	200	236	272	272	277
NCC % of total	0	1.8	6.0	4.2	4.0	7.5	8.9	8.3	7.8	8.6	9.3	9.3	9.5

[a] 1981-90 populations are from CWACOG Scenario II projections excluding Northern Coal Company's (NCC) population and holding Rio Blanco Oil Shale Company (RBOSC) constant at 45 employees. NCC-related population remains stable after 1992. Anticipated mine life--50 years.

[b] New Meeker mines-related population: 147 existing employees in 1980 baseline. Assume 73% will live in Meeker.

[c] Baseline from CWACOG without NCC and holding RBOSC at 45 employees. NCC housing needs are incremental; when the previous year's supply is greater than the present year's need, the difference is expressed as "0," not a negative number.

[d] Includes direct and indirect population. 147 existing employees are in baseline.

Table 4-4.--Socioeconomic assessment, key assumptions

Assumptions
Employment multiplier of 0.9 permanent and 0.2 construction.
Northern Coal production 200,000 tons in 1980 to 4,367,500 in 1992.
No local hiring for the required additional permanent workforce.
All construction workers to be hired from the regional construction force.
Seventy-three percent of total NCC employment assumed to live in Meeker.
Demographic assumptions for NCC population computation: Operations: 60 percent, married 40 percent, single 3.2 persons, family size 1.2 children/family 0.75 school-age children/family Local service--operations and construction related: 40 percent, married 30 percent, single 40 percent, non-head of household 3.2 persons, family size 1.2 children/family 0.75 school-age children/family
Household size of 2.7 used to project Meeker baseline housing requirements.
Household size of 2.95 used to project Rio Blanco baseline housing.
Fiscal projections
Future tax rates are held constant at 1981 levels. Mill levies are: 10.03 Rio Blanco County 19.55 Meeker 50.33 RE-1 School District
The expenditure for each new capital facility is projected for the year in which needed, whether or not sufficient revenues to pay for the facility are available from bond sales, reserves, or other sources. When this results in a theoretical budget deficit, it flags a need by the jurisdiction for planning ahead to resolve the dilemma.

Table 4-4.--Socioeconomic assessment, key assumptions--Continued

Fiscal projections--Continued

Revenues and operating expenditures--primarily projected on straight per capita basis--future rates were approved by local officials.

Outside revenue sources such as Oil Shale Trust Fund monies and contributions from industry were included if a given amount and year were known.

Capital expenditures--relied heavily on the County-Wide Capital Improvements Program and Parks and Recreation Master Plan. Also used conventional planning standards. Projections were reviewed by local officials.

Assessed valuation assumptions:

Assessed value equal to 16 percent of market value.

Two-year lag between time facility built and time it generates property tax revenues.

Residential market values:

$72,400, single family
$40,400, multifamily
$16,600, mobile home

Original breakdown of housing by type used to estimate residential assessed value (percentages changed over time to reflect increases in multifamily units as a portion of total housing):

60 percent, single family
10 percent, multifamily
30 percent, mobile home

Commercial and industrial assessed value computed on a per capita basis using 1980 as the base year.

Agricultural assessed value assumed to remain constant.

Sales tax: projected on per capita basis--doubling the 1980 rate to reflect increase in tax rate from 1 percent to 2 percent for municipalities.

1980 and 1981 budgets reflect local actual and estimated budgets for these years.

Surpluses from previous years were not included as a line item, but the 1980 cumulative balance reflects surplus of funds from preceding years.

A complete list of assumptions are available in the Denver Research Institute report available at the Office of Surface Mining, Denver, Colorado.

NCC has provided financial backing to the 104-lot Sage Hills subdivision in Meeker to alleviate the housing problem for employees. One-third of these lots are reserved for mine workers. If current trends continue, the majority of mine employees would have difficulty in purchasing single-family houses. The lack of mobile home spaces, multifamily units, and temporary quarters would be most severe in the initial stages of the Meeker area mines expansion.

Rio Blanco County, the town of Meeker, School District RE-1, and related special districts would have to expand or improve nearly all of their facilities and services to accommodate projected population growth, with or without the Meeker area mines. Major capital improvement expenditures required over the next 5 to 10 years in Rio Blanco County are summarized in table 4-5. Those directly affecting the Meeker area total $55.5 million, plus $12 to $15 million of the County Road Department improvements.

Timing of specific capital improvement projects will depend on availability of funding and actual population growth. As of spring 1982, announcements by a number of energy companies of project postponements or cutbacks will extend plans and the period over which these capital improvements are undertaken. The ultimate need, nevertheless, remains. Funding these improvements will be a continuing challenge for Rio Blanco County entities. Approximately $20 million of the required $110 million countywide total will come from impact funds: the 1981 final distribution of $16.6 million in principal from OSTF, and distribution to Rio Blanco County jurisdictions of approximately $300,000 annually from the Colorado Mineral Leasing and Severance Tax Fund. The bulk of the funding will have to come from other sources, primarily property and sales/use taxes, utility tap fees, user fees, bond sales, and industry-supported mitigation programs.

The Meeker area mines would have mixed impacts on the economic well being of local governments in the area. Positive fiscal impacts are measured in terms of total revenues generated by the operation and its related population. Negative fiscal impacts appear when the cost of providing services and capital improvements for the project-related population exceeds revenues generated by the population.

To provide a comprehensive assessment of these positive and negative impacts, a fiscal modeling analysis was prepared by the Denver Research Institute, comparing revenues and expenditures with and without the Meeker area mines. The purpose of this analysis is to (1) attempt to forecast the net financial impact of a project on local governments, (2) pinpoint potential financial problems and instigate thinking and planning to minimize negative impacts, and (3) trigger constant reevaluation of the essential need, scope, and timing of projected expenditures for capital improvements and service expansions in light of available revenues.

The model projected public revenues and expenditures over a 14-year period for three local jurisdictions--Rio Blanco County, the town of Meeker, and School District RE-1. The model is based on specific assumptions about population growth, variable per capita costs, capital improvements required at certain population levels or based on conventional planning standards, and changes in revenues and expenditures anticipated over time (See table 4-6.)

Table 4-5.--Summary of countywide capital improvements program in Rio Blanco County

(Needs projected on anticipated growth rate* over next 10 years. Source: Countywide Capital Improvements Program, Rio Blanco County, May 1981, Colorado West area COG)

Agency	Total estimated cost (thousands of 1980 dollars)	Principal projects
Cooperative town-county government complex (Meeker)	$ 2,827**	Facility study, expand fire space, remodel existing courthouse/jail and/or other facilities for shared usage, site improvements.
Town of Meeker	8,400	Water, streets, drainage, and miscellaneous improvements.
Meeker Sanitation District	1,600	Expansion of sewage treatment plant.
Meeker Eastern Recreation District	5,802	Parks, recreation facilities, and a major new community center.
Meeker RE-1 School District	32,281	Kindergartens (4), elementary (3), middle (1), high school (2), buses, and storage.
Horizons for Handicapped	144	Provision of special facilities for preschool and adult physically impaired.
Library District	339	Expansion of existing Meeker library.
Pioneer's Hospital (Meeker)	4,093	Expansion of hospital, nursing home beds, and auxiliary facilities.
Subtotal, Meeker area	$55,486	
Rio Blanco County Road Department	$21,635	Widen, pave, and improve roads throughout county, build two bridges, miscellaneous.
Town of Rangely	$13,354	Water, sanitation, public works, public safety, and community development.
Rangely RE-4 School District	7,450	One each: elementary, middle, and high school.
Rangely District Hospital	3,221	Expansion from 28 to 40 beds, construction of 40-bed nursing home, miscellaneous.
Rangely human services	489	Expansion of library, social service offices, center, and day-care facility.
Colorado NW Community College District	$ 8,400	Classroom/Fine arts buildings, student union, dorm, athletic, and miscellaneous improvements.
Subtotal, Rangely area	$32,914	
Countywide total	$110,035	

*Utilizing CWACOG Scenario II population projections (1981 plans of energy development companies, including Northern Coal Company).

**Does not include cost of replacement of any facility (such as central elementary school or hospital) converted to joint use.

Table 4-6.--Net fiscal impact of NCC mine expansion on Rio Blanco County, town of Meeker, RE-1 School District

(Values given in thousands of 1980 dollars. Source: Socioeconomic Assessment for the Meeker area mines, Rio Blanco County, Colorado; Denver Research Institute, 10-81)

Year	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Rio Blanco County																
With NCC project:																
Total revenues	$5,706	$5,489	$16,759	$22,457	$18,327	$30,470	$25,327	$28,748	$25,525	$34,466	$30,935	$30,196	$30,847	$29,494	$27,516	$27,871
Total expenditures	5,479	5,921	21,450	16,552	11,404	22,286	16,377	17,333	16,200	24,999	20,932	19,126	19,131	19,120	19,107	19,095
Surplus/deficit	227	-432	-4,691	5,905	6,923	8,184	8,950	11,415	9,325	9,467	10,003	11,070	11,716	10,374	8,409	8,776
Without NCC project:																
Total revenues	$5,706	$5,489	$16,463	$17,925	$23,390	$29,475	$24,627	$26,132	$26,638	$26,805	$35,196	$29,276	$29,913	$28,507	$26,513	$26,868
Total expenditures	5,479	5,921	21,190	10,211	16,670	21,759	15,750	14,556	17,444	16,316	24,992	17,996	17,985	17,972	17,960	17,948
Surplus/deficit	227	-432	-4,727	7,714	6,720	7,716	8,877	11,576	9,194	10,489	10,204	11,280	11,928	10,535	8,553	8,920
Net benefit/cost:	0	0	36	-1,809	203	468	73	-161	131	-1,022	-201	-210	-212	-161	-144	-144
Town of Meeker																
With NCC project:																
Total revenues	$3,028	$1,185	$ 1,939	$ 3,758	$ 4,375	$ 3,921	$ 3,429	$ 4,532	$ 4,198	$ 5,067	$ 4,964	$ 4,259	$ 4,347	$ 3,996	$ 3,992	$ 3,987
Total expenditures	3,233	1,812	1,558	10,982	5,426	3,226	3,162	4,143	3,813	4,632	4,568	4,498	4,538	4,198	4,193	4,189
Surplus/deficit	-205	-627	381	-7,224	-1,051	695	267	389	385	435	396	-239	-191	-202	-201	-202
Without NCC project:																
Total revenues	$3,028	$1,185	$ 1,556	$ 3,742	$ 3,823	$ 3,943	$ 2,946	$ 3,652	$ 3,835	$ 4,610	$ 4,348	$ 3,790	$ 3,849	$ 3,508	$ 3,503	$ 3,498
Total expenditures	3,233	1,812	1,434	10,871	2,764	5,476	2,891	3,246	3,463	4,343	4,110	4,051	4,084	3,744	3,740	3,735
Surplus/deficit	-205	-627	122	-7,129	1,059	-1,533	73	406	372	267	238	-261	-235	-236	-237	-237
Net benefit/cost:	0	0	259	-95	-2,110	2,228	194	-17	13	168	158	22	44	34	36	35
School District RE-1																
With NCC project:																
Total revenues	$2,321	$3,931	$ 2,810	$ 8,459	$15,176	$ 9,520	$14,554	$28,490	$37,074	$43,734	$49,069	$54,778	$57,940	$62,242	$65,037	$65,031
Total expenditures	2,360	7,187	2,612	8,746	15,699	7,179	7,193	7,507	7,824	8,307	8,612	8,605	8,610	8,602	8,593	8,490
Surplus/deficit	-39	-3,256	198	-287	-523	2,341	7,361	20,983	29,250	35,427	40,457	46,173	49,330	53,640	56,444	56,541
Without NCC project:																
Total revenues	$2,321	$3,931	$ 2,744	$ 7,650	$14,016	$ 8,137	$12,619	$26,328	$34,814	$41,373	$46,852	$52,278	$55,406	$59,450	$62,162	$62,155
Total expenditures	2,360	7,187	2,468	8,602	15,439	6,893	6,752	7,071	7,388	7,701	8,099	8,011	8.005	7,997	7,989	7,885
Surplus/deficit	-39	-3,256	276	-952	-1,423	1,244	5,867	19,257	27,426	33,672	38,753	44,267	47,401	51,453	54,173	54,270
Net benefit/cost:	0	0	-78	665	900	1,097	1,494	1,726	1,824	1,755	1,704	1,906	1,929	2,187	2,271	2,271

Note: The purpose of this analysis is to indicate fiscal trends with/without the Meeker area mines. Some caution should be used in interpreting the net figures as "absolute."

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US GOVERNMENT PUBLICATIONS (depository)
Interior Dept
Proposed mining...Meeker Area mines...CO 1982

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Implications of the modeling analysis for the three jurisdictions are summarized as follows:

Rio Blanco County.--Without the Meeker area mine expansion, county revenues are expected to increase at an average annual rate of 10.9 percent between 1980 and 1995, versus an annual increase of 11.2 percent with the project. County expenditures are projected to grow 8.25 percent annually between 1980 and 1995 without the project. The highest growth rate is projected for the mid-1980's. However, with the mine expansion, expenditures are expected to increase at an average annual rate of 8.7 percent. Thus, for Rio Blanco County, expenditures due to the mines will increase more than revenues resulting from the mines. Table 4-6 indicates that for 9 of the 14 years projected, the mine will have a negative fiscal impact on the county.

Town of Meeker.--Revenue growth for Meeker is projected to be 3.7 percent annually from 1980 through 1990. From 1990 to 1995, revenues decrease at an average annual rate of 4.3 percent as the town's population decreases. With the Meeker area mines, the town's average annual revenues would grow 5.9 percent from 1980 to 1989, declining 3.9 percent annually from 1989 through 1995.

Meeker's expenditures without the project would increase annually at 3.4 percent from 1980 to 1989. From 1989 to 1995, expenditures would decrease at an average annual rate of 2.5 percent, with budgetary shortfalls projected. With the project, expenditures would increase 4.1 percent from 1980 to 1989, falling at a rate of 1.7 percent annually from 1989 through 1995. The annual impact on the town would be positive in 11 of the 14 years projected. The greatest impact would come in 1985, when Meeker's projected deficit of $1,533,000 without the mine would be turned into a $695,000 surplus with the mine. Overall, the mine operation would be a definite asset to the town of Meeker.

School District RE-1.--For School District RE-1, the mines would reduce the fiscal surplus slightly for 1982, but increase projected surpluses for all other years. Overall, between 1980 and 1995, the mine expansion would provide substantially more revenues than expenditures for School District RE-1.

The Meeker area mines would accelerate capital improvement needs provided by special districts within the town of Meeker and Rio Blanco County. For example, the project-related population would require expansion of the storage system for Meeker's water supply in 1984; without the project this expansion would be required in 1985. The county fire department would require building expansion in 1989 to accommodate the county's population with the project; without the project, the expansion would be necessary in 1990. In 1989, an addition of 20 beds to the county hospital in Meeker would be required to serve the population with the project; this same improvement would be required in 1990 without the project.

The most significant capital expenditures that would be triggered by the project-related growth are: (1) the need for an additional vehicle for the town's police department in 1982 and 1990; (2) an additional vehicle for the county sheriff's department in 1983 and 1989; and (3) building expansion of the county fire department in 1983. Operating and maintenance costs for all public services and facilities would increase as a result of the project.

In summary, Rio Blanco County will not gain from the mine expansion because required expenditures will outweigh revenues. The substantial growth in

county-assessed valuation due to the Meeker area mines would not produce an equivalent increase in property taxes owing to the county's low mill levy. However, even without the mine expansion, the county's revenues would be substantial, assuming that energy-related growth and development occur as projected. With the mine expansion, the surpluses would be slightly lower but, nonetheless, substantial. The town of Meeker will generally gain from the mines because of revenue increases in sales/use taxes and utility tap fees. School District RE-1 stands to gain the most because of increased assessments coupled with a relatively high mill levy.

Meeker is undergoing various degrees of sociological changes as a result of increasing population. Residents and human service workers are concerned about increased crime, divorce, and alcohol-related problems. Newcomers and long-time residents enjoy the natural environment surrounding Meeker, the small-town atmosphere, and supportive relationships among residents (University of Colorado, 1982). These aspects will change as a result of the overall population growth with or without the Meeker area mines. The project will increase the number of newcomers in Meeker, but it would also provide a potential source of jobs for the town's young people and those who may be unemployed as a result of the current slump in the energy industry.

The major project-related socioeconomic impacts requiring mitigation would be the overall lack of affordable housing and shortage of lower cost units, such as mobile homes and apartments. Mitigation measures may have to be designed to offset the budgetary shortfalls local entities would experience when providing public services and facilities to the mine-related population during the initial years of mine expansion.

The county has enacted an Impact Regulation to create opportunities for mitigating socioeconomic impacts attributable to energy projects. If projects are found to have a potential adverse impact on the county and its municipalities, the developer must file an Impact Analysis Statement. The expansion of the Meeker area mines would require NCC to comply with the Impact Regulation and to obtain a county Special Use Permit. NCC has stated its intent to provide an updated socioeconomic impact assessment as may be required by Rio Blanco County. This assessment would reevaluate the applicant's plans and reflect changes in the county's economic conditions and projections.

The county also has the ability to approve the local permit, conditioned on the developer's implementation of identified mitigation measures. OSM will review the agreements that may be negotiated by the county and company prior to issuance of the 5-year mining permit for the Meeker area mines. (See appendix C.)

TRANSPORTATION

Road traffic would increase noticeably on State Highway 13/789 northward from Meeker and southward from Craig to the mine areas. Traffic would become the heaviest during construction workshift changes, causing increased dust disturbance, noise, and delays in traffic. According to a traffic-count study conducted on a segment of State Highway 13/789 within the study area, the peak-hour traffic would increase from about 200 vehicles in 1980 to about 623 vehicles in 1996. Approximately 72 percent of this vehicle increase would result directly or indirectly from mining activities. The capacity of State Highway 13/789 was also

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analyzed in the traffic-county study. It was determined that any increase of peak-hour traffic above 500 vehicles would cause the degrading of level-of-service "C" on State Highway 13/789.

The potentials for impacts caused by degrading of level-of-service "C" on State Highway 13/789 are upgrading the highway surface, decreasing vehicle operating speed, increasing highway maintenance, increasing air pollution, increasing noise, increasing animal roadkills, and increasing traffic accidents.

Short-term environmental impacts would be primarily noise and dust along the access and haul roads. Dust will be controlled by standard dust suppresssion techniques (i.e., watering, special surfactants, etc.). The long-term environmental impacts would be minimal, since NCC has committed to reclaim roads and disturbed areas upon cessation of mining. The net environmental impacts from the roads within the study area would be negligible.

The railroad construction for the proposed Milk Creek rail loadout consists of an approximately 2-mile spur track and a 1.4-mile-long loading loop track. At maximum production, 330 to 430 unit trains per year would be required at the proposed Milk Creek rail loadout. This would only add approximately one to two trains per day to the D&RGW line. D&RGW estimates rail traffic to be 29 trains per day by 1995, which corresponds to the maximum coal production year. The additional trains from the proposed Milk Creek rail loadout would increase this to 30 or 31 trains per day. Therefore, it is not anticipated that the mining would significantly increase rail traffic on the D&RGW.

The short-term environmental impacts connected with the construction and use of the rail extension to the proposed Milk Creek rail loadout are the same as discussed for the roads within the study area. No new grade crossings are anticipated. The long-term impacts would result from the mines in the study area utilizing the new rail extension.

If coal production is not expanded into these areas, no long-term environmental impacts due to transportation are anticipated. The short-term environmental impacts from construction of the access roads within the PRLA areas would be minimal, consisting mainly of noise and dust along the roads.

Increased traffic to the minesites would not add any significant strain on the Hayden Airport.

ENERGY REQUIREMENTS

The total energy requirements by actual mine operations, the ancillary facilities, and offsite transportation would be approximately 1 percent of the total energy produced. This figure appears to be a standard amount for Western underground mining. The analysis substantiating this is on file in OSM's Western Technical Center Offices.

Ninety-four trillion Btu's of energy are projected to be produced annually at full production from 1992 through 1996. During these same years, approximately 0.6 trillion Btu's would be consumed each year. In the latter years of mining, the overall efficiency of the operations would be expected to increase due to the higher efficiency of the long-wall units as opposed to the continuous-miner units,

and proportionately more production would come from the long-wall units than from the continuous-miner units. Development work by the continuous miners during the earlier years of operation would enable higher productivity by the long-wall units in the mature mines.

RECREATION

Impacts to recreation on and directly adjacent to the study area would be insignificant. Heavy hunting in the vicinity of the study area is mostly on or accessed by private land. The cumulative population increase would have a significant impact on recreation in Meeker and would require continual expansion to meet population needs.

The primary impacts of mining on recreation opportunities would be insignificant, as the study area is used only for short-season intensive big game hunting. The private and leased land in the study area is opened to hunters that pay landowners for hunting recreation opportunities. The overall recreation experience for an individual may be diminished by the increase in population, but this impact may not be significant in the rural setting.

Secondary impacts on recreation resources would be an increase in the number of people participating in and demanding more indoor and outdoor urban recreational opportunities. Impacts to rural outdoor recreation opportunities, such as hunting, fishing, wildlife photography, ORV use, cross-country skiing, snow-mobiling, and use of National Forest lands, would be insignificant.

CULTURAL RESOURCES

The majority of the cultural resources, archeological and historic, recorded by the surveys were assessed as not significant and ineligible for inclusion in the NRHP. No further work will be undertaken on these sites. Impacts to these sites would be insignificant because of their lack of significant value and the relatively low level of impact from underground mining. The possibility exists of impact to unobserved or buried resources. (See figure 3-12, Cultural Resource Inventory Study.)

Sites whose eligibility is unknown should be evaluated and a determination of eligibility made in consultation with the Colorado SHPO based on test results. If determined eligible and likely to be impacted, an appropriate data recovery program would be implemented as mitigation prior to impact.

Impacts to any site or sites eligible for the NRHP would be mitigated by appropriate data-recovery programs for implementation prior to impact. The consequences of potential impact to such resources would be beneficial to the regional data base, as new information would be acquired from these mitigation programs and made available to the archeological and historic communities. Final reports on assessments of potentially eligible sites would be submitted and the appropriate mitigative measures would be proposed for any sites determined eligible.

The increased population of the region and increased usage and accessiblility of the sites in the study area may lead to impacts from vandalism and unauthorized collection.

ESTHETICS

Esthetic impacts would be moderately significant from observer viewpoints along State Highway 13/789 with respect to construction of new mine facilities and the overall terrain. However, over the study area, most of the land disturbance would occur in low visual sensitivity areas that are seldom seen. Overall visual quality and esthetic impacts are expected to be insignificant.

Mine facilities would exhibit a medium to high contrast to existing landscape in the valley and canyon area. Form would be defined by new buildings and coal handling facilities. Lines created by nearly horizontal conveyors and other facilities would contrast diagonal and subvertical lines in the existing landscape. Color would be interrupted by removal of some trees and lightening of hillside areas by roadcuts and exposure of embankments. The primary visual impact of the project would be to diminish visual pattern and character elements. The refuse disposal area may have visual impacts on observers passing by on the highway, particularly if attention is drawn by signs, and during later stages in the mining sequence as the refuse disposal pile increases in height. Passengers in vehicles traveling both directions through Curtis Creek Canyon would observe the changes and diminished visual quality of the facilities. The new mining facilities would be visible along a 4-mile stretch of State Highway 13/789. The visual impacts to observers on the highway are unavoidable in terms of form and line because of lack of physical space for mining facilities and buildings in the canyon away from public access.

The overall impact to the study area would range from moderately significant along State Highway 13/789 to insignificant behind the hills as visual sensitivity decreases away from public access. Overall scenic quality would be rated as characteristic for the study area. Following successful reclamation, the contrast originally created by mining facilities with the landscape would be virtually eliminated when the vegetation becomes reestablished. The VRM (Visual Resource Management) rating would remain Class IV following reclamation.

NOISE

The projected noise environment during peak production of the four mines would be controlled by noise generated by mining activities, noise generated by trucks hauling coal along State Highway 13/789, and noise from the train loading of coal at the proposed Milk Creek rail loadout.

Table 4-7 summarizes the radial distance of the L_{eq} = 55 dB(A) noise contour for existing conditions and for projected conditions during peak production. The radial distances neglect the effects of naturally existing topographical barriers and area applicable to locations only where line of sight exists between noise source and receiver.

Table 4-7.--Summary of radial distances of L_{eq} = 55 dB(A) noise contours under existing and peak production conditions (neglecting barriers)

Noise source	Existing conditions[a]	Projected conditions during peak production[a]
Northern No. 1 mine	925 (65)	925 (65)
Rienau No. 2 mine Northern No. 2 mine[b] Northern No. 3 mine[b]	925 (65)	2,625 (500)
Truck haul route (State Highway 13/789)	225 ([c])	650 (---)
Loading noise at Wilson-Loudy rail loadout area	1,850 (250)	2,450 (450)
Train noise at Wilson-Loudy rail loadout area	4,600 (1.550)	4,600 (1,550)
Loading noise at proposed Milk Creek rail loadout area	([b])	2,900 (600)
Train noise at proposed Milk Creek rail loadout area	([b])	4,600 (1.550)

[a] First value = radial distance to L_{eq} = 55 dB(A) noise contour, in feet; second value (in parentheses) = area encompassed by noise contour, in acres.

[b] Noise sources which are not operating under existing conditions.

[c] Radial distance along State Highway 13/789 not calculated in terms of acreage.

The L_{eq} + 55 dB(A) noise contour for existing conditions at the Northern No. 1 mine encompasses a radial distance of 925 feet. The noise environment within the area surrounding this mine would not change appreciably because coal production would not be significantly increased.

The noise environment within the area surrounding the Rienau No. 2, Northern No. 2, and Northern No. 3 mines is controlled by the noise generated at the Rienau No. 2 mine under existing conditions. If the Northern No. 2 and Northern No. 3 mines are in full production, the zone of noise impact defined by

the L_{eq} = 55 dB(A) noise contour would be expanded from 65 acres under existing conditions to 500 acres during peak production years (1996). The radial distance of the noise contour would be increased from 65 feet to 500 feet.

The distance from the center line of the coal haul route at which the L_{eq} is 55 dB(A), under existing conditions, is 225 feet. The 55 dB(A) L_{eq} contour would be located 125 feet from the center line of the road if the Rienau No. 2 and Northern No. 1 mines were not operating. During peak mine production (1996), the distance from the center line of the haul route to the 55 dB(A) L_{eq} contour would be increased to 650 feet. At this time, the traffic noise impact along the truck haul route is controlled by coal haul trucks. The contribution of automobiles and medium trucks on the overall noise level is not significant.

Noise associated with activity at the Wilson-Loudy rail loadout area is currently reduced to a L_{eq} value of 55 dB(A) at a distance of 1,850 feet from this rail loadout area. This distance would reach a maximum value of 2,450 feet during peak production prior to its closing. As activity is transferred to the proposed Milk Creek rail loadout area, the noise environment would initially be comparable to the Wilson-Loudy rail loadout area. However as production reaches peak values (1996), the distance to the L_{eq} noise contour would be increased to 2,900 feet. The total area impacted by noise at the proposed Milk Creek rail loadout area would be approximately 600 acres.

As trains move throughout the loadout areas, sound levels of 55 dB(A) would occur at distances of 4,600 feet from the diesel engines. The L_{eq} contour would be dependent on the number of trains utilizing the loadout areas in a specified time interval.

BLASTING

NCC's underground coal mining methods, as proposed in the MRP, would not require the use of explosives. Therefore, it is assumed that no surface blasting would be required except for a limited amount during construction of surface facilities. Thus, no significant environmental impacts would be created.

UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

Topography

Mining operations would result in unavoidable alterations in the existing topography at the mine portals, along haul roads, in the supply yard and central shop areas, and particularly in the refuse disposal area. Ground subsidence due to the underground mining activity would also be likely, with as much as 11 feet of subsidence occurring locally. These effects would all be limited to the immediate vicinity of the mined areas. Upon reclamation, the 140 acres disturbed at the surface would be restored to a condition similar to the premining state.

Geology

The removal of underground coal seams would have several effects on the local geology. Mining activities would preclude any exploration for oil or gas in the mined area, although such activity could resume following completion of the

mining activities. Subsidence of overburden formations following removal of coal seams is probable. leading to fracturing and other disruption of these overburdened formations.

Soils

The stockpiling and blending of topsoil materials would result in some degradation in the quality of the more productive topsoil but some improvement in the quality of the more unproductive soils. Side effects of the stockpiling operations would include a loss of soil micro-organisms, soil nutrients and soil matter, and an increase in soil erosion losses. The soil disturbances would result in a loss of soil structure, although this would slowly return to premining conditions.

Surface-Water Hydrology

Several unavoidable adverse effects on the surface water resource would occur as a result of the mining operation. Some loss in surface water runoff would be likely, due to increased ground-water infiltration in the mining areas. It is estimated by NCC that this decrease would amount to as much as 20 percent of the current surface-water supply, calculated on an annual basis. This figure is based on 1979 measurements and is considered a worst-case estimate--actual amounts are expected to be lower. To a certain extent, this effect is temporary, although some modest reduction in surface-water runoff should be anticipated on a permanent basis. A second effect would be a moderate decrease in quality of the surface-water resource owing to leaching and subsequent runoff from the waste disposal area. and to mine dewatering operations. The magnitude of the allowable water-quality degradation would be limited by the applicant's existing NPDES permit. A third effect on the surface-water resource would be an increase in stormwater peak runoff rates during mining operations, particularly owing to loss of vegetation and decreased infiltration capacity in disturbed soil areas, but this is expected to be mitigated by sedimentation ponds built in critical areas to catch this runoff. These ponds are designed to contain a 10-year. 24-hour precipitation event. This effect would be most evident in small, highly disturbed tributaries, with only minor increases in runoff rates from the main stem of Curtis Creek.

Ground-Water Hydrology

The most significant effect of the mining operation on the ground-water resource of the area would be a lowering of the water table in the mined area and extending as much as 4,500 feet away from the site. This decline in ground-water levels would be attributable to mine dewatering operations and to increased vertical permeabilities resulting from fracturing of overburden formations and construction of underground shafts and room-and-pillar cavities. Most of this effect would be local and of little regional significance. The characterisitics of the only important ground-water aquifer in the area, the Trout Creek Sandstone, would probably remain unchanged. since this formation is located 500 feet below the lowest seam that would be mined. Some local degradation of ground-water quality would be likely as a result of mining operations, primarily from infiltration of water into and through the mine waste disposal area.

Alluvial Valley Floors

Reclamation at the Meeker area mines will generally restore the essential hydrologic functions of each alluvial valley floor. If subsidence occurs, it could

cause minor effects on the subirrigated area of the FF tributary alluvial valley floor by draining the alluvial aquifer or by lowering the shallow water table. It could also lead to a small but currently unquantifiable reduction in surface-water flow by the possible interception of water.

Vegetation and Land Use

Mining activities would result in loss of grazing lands and wildlife habitat on 140 acres. Upon reclamation, the vegetation would support premining land uses. However, postmining vegetation types would differ somewhat from that which exist today.

Wildlife

Roadkills of wildlife could increase owing to higher levels of haul trucks transporting coal and personnel travel to the area. Elk critical winter range would be slightly reduced because of land development for mining operations. Deer and elk would also be displaced from portions of existing migration routes.

Socioeconomics

The proposed action would provide direct and indirect employment to workers, thereby enhancing the long-term economy of the area. However, the population growth would increase demands for community services and facilities. Potential short-term impacts include: lack of affordable housing, increased traffic congestion, some budget shortfalls, and the need for increased human services. In the long term, as local revenues increase, the economic situation would stabilize at new levels of use and need.

Transportation

Mining activities would increase the potential for traffic congestion, road maintenance, and accidents.

Energy Consumption

Electricity would be consumed to power the mining operations and ancillary equipment/facilities. Petroleum-base products would be consumed for hauling coal offsite and providing transportation for employees and vendors.

Recreation

Use of indoor and outdoor recreation facilities would increase as a result of population increases.

Cultural Resources

Increased population in the area and increased usage and accessibility of existing cultural resource sites would most likely lead to impacts from vandalism and unauthorized collection of artifacts.

Esthetics

Mining and ancillary facilities would add visual intrusions to observers passing near the study area on State Highway 13/789 during construction and active mining. Following reclamation, these intrusions would be virtually eliminated as vegetation becomes reestablished.

Noise

Increases in the existing noise environment would be unavoidable as a result of increased mining activities and transportation in the area.

IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Geology

The coal mined, consumed, and left in underground pillars would be irretrievably lost for future uses. The amount of coal to be mined is estimated to total about 189,608,000 tons. An accurate estimate of the amount of coal that would be left underground is not available, although 284,000,000 tons coudl be left if total recovery were 40 percent.

Soils

The loss in soil due to erosion of unprotected areas and from the stockpiles can be considered irretrievable. Over the near term, the loss in soil structure is irreversible.

Surface-Water Hydrology

A slight permanent loss in surface-water runoff is expected, owing to an unavoidable increase in ground-water infiltration. This loss in surface-water runoff is an irreversible condition, although it is expected to be a minor impact.

Ground-Water Hydrology

The only notable irreversible change in the ground-water resources would be a local decrease in the elevation of the water table in the mined area. Water levels should rise somewhat following cessation of mining activity but would probably never return to premining levels.

Construction Materials

Materials, such as aluminum, copper, and steel, used in the manufacturing of mining equipment and facilities would be permanently committed for use during the proposed life-of-mine operations. However, much of these materials would be salvaged upon abandonment of equipment and facilities.

Wildlife

Temporary interference with deer and elk migration routes would occur as a result of the mining operation. This interference could be reduced if the timing and nature of regional mining, mitigation efforts, and location of critical regional

migration routes are defined, and all mining developments are planned to maintain migration.

Socioeconomics

Cummulative impacts from energy development would accelerate Meeker's transition from a "small town" to a more urban setting. Population growth would increase demands for public services and facilities in Meeker.

CHAPTER 5

PREPARERS AND REVIEWERS

Name	EIS Responsibility	Education
	ACZ, Inc.	
Alan W. Czarnowsky	Energy consumption	B.S., Mining Engineering, Colorado School of Mines
Eldon D. Strid	Energy consumption	B.S., Mining Engineering, South Dakota School of Mines and Technology
	Bureau of Land Management	
Richard M. Arcand	Technical review	B.S., Range Management, University of Wyoming
Betsy Daniel	Technical review	M.A., Geochemistry, Johns Hopkins University
Gregory S. Goodenow	Technical review	B.S., Forest Management, Colorado State University
Gregory Graff	Technical review	M.A., Urban and Regional Planning, University of Colorado
	Engineering Dynamics	
John Barthell	Noise	B.S., Mechanical Engineering, Florida Atlantic University
Howard McGregor	Noise	M.S., Electrical Engineering, University of Denver
Steve Rossi	Noise	B.S., Electrical Engineering, Metropolitan State College
	ERO Resources Corporation	
Erik R. Olgeirson	Vegetation	Ph. D., Plant Ecology, University of Colorado

Name	EIS Responsibility	Education
James M. Montgomery, Consulting Engineers Inc.		
Gary E. Brothers	Graphics	B.S., Industrial Education. Northwestern State University
Robert M. Brown	Transportation	M.S., Environmental Engineering, Iowa State University
Douglas H. Chapin	Project manager	B.S., Biology, Whitworth College
Hollister P. Cline	Graphics	A.S., Mechanical Engineering, Iowa State University
H. Tom Davis	Surface-water hydrology and wildlife	M.S., Water Resources Engineering, University of Idaho
Robert I. Eidemiller	Climate and air quality	M.S., Physical Geology, Louisiana State University
Brian D. Liming	Recreation and esthetics	M.S., Environmental Engineering, Stanford University
Richard L. Parks	Graphics	Drafting Engineering Technology, Metropolitan State College
Robert H. Ramsey	Topography, geology, and ground-water hydrology	M.S., Geology, University of Southern California
	Northern Coal Company	
Diane L. Geyer	Mine plan and technical adequacy	B.S., Environmental Geology, Lehigh University
	Office of Surface Mining	
Charles M. Albrecht	Technical and environmental overview	E.M., Mining Engineering, Colorado School of Mines
Marlene G. Berg	Technical advisor for soils and land use	M.S., Soil Chemistry, University of Illinois

Name	EIS Responsibility	Education
	Office of Surface Mining--Continued	
Sarah E. Bransom	Socioeconomics; technical advisor for transportation and recreation	M.S., Planning and Community Development, University of Colorado
Piero B. DeSimone	Technical advisor for vegetation and post-mine land use	B.S., Natural Resource Management, Arizona State University
Carol B. Hurr	Technical publications editor	B.A., Secondary Education. Occidental College
Floyd Johnson	OSM assistant technical project officer; technical advisor for climate and air quality	M.S., Meteorology. Utah State University
Shirley F. Lindsay	Technical advisor for wildlife	M.S., Wildlife Biology, Ohio State University
John Lovell	OSM technical assistance	B.S., Forest Management, University of Montana
Judy Shafer	Technical review for cultural resources	M.A., Archaeology, University of Colorado
Jennifer Shawe	Word processor	B.A., English, University of Denver
Bennett H. Young	OSM technical project officer; technical advisor for geology, hydrology, and topography	M.S., Geology, University of Colorado
	Powers Elevation	
Robert A. Williams	Cultural Resources	B.A., Anthropology, Colorado College
	University of Kentucky	
Richard I. Barnhisel	Soils	Ph. D., Soils and Geology-Chemistry, Virginia Polytechic Institute

CHAPTER 6

CONSULTATION AND COORDINATION

The following are those agencies, organizations, and individuals to whom copies of the draft EIS will be sent:

Federal:

U.S. Department of Agriculture:
- Farmers Home Administration
- Forest Service
- Soil Conservation Service

U.S. Department of the Army:
- Corps of Engineers

U.S. Department of Commerce

U.S. Department of Defense:
- Environmental Control Office

U.S. Department of Energy

U.S. Department of Health. Education and Welfare

U.S. Department of Housing and Urban Development

U.S. Environmental Protection Agency

U.S. Department of the Interior:
- Federal Energy Regulatory Commission
- Fish and Wildlife Service
- Minerals Management Service
- Heritage Conservation and Recreation Service
- Office of Surface Mining

U.S. Department of Justice

U.S. Department of Labor:
- Mine Safety and Health Administration

U.S. Department of Transportation

U.S. Interstate Commerce Commission

U.S. Nuclear Regulatory Commission

U.S. Office of Economic Development Administration

State:

Colorado State Clearing House
Colorado State Mined Land Reclamation Board
Colorado State Historic Preservation Officer

County and Regional:

Colorado West Area Council of Governments
Delta County
Eagle County
Garfield County
Grand County
Jackson County
Mesa County
Moffat County
Montrose County

County and Regional--Continued

Northwest Colorado Council of Governments
Pitkin County
Public Lands Council
Rio Blanco County
Routt County
Summit County
Water Resources Council

Organizations:

Colorado Cattlemen's Association
Colorado Mining Association
Colorado Open Space Council
Colorado Wilderness Society
Colorado Wool Growers' Association
Environmental Defense Fund:
    Friends of the Earth
    Sierra Club
    Western Interstate Energy Board
National Coal Association
Natural Resources Defense Council
National Wildlife Federation
Northern Coal Company
Public Lands Institute
Rocky Mountain Coal Assocation
Rocky Mountain Oil and Gas Association

Other Organizations and Individuals:

Surface landowners associated with PRLA's C-0126997 and C-0126999, numerous organizations, and individuals expressing interest in the DEIS will be send copies of it for comment. Surface landowners include the following:

PRLA C-0126997:

Jim Dodo
Philip and William Jensen
Richard and George Rienau
David Smith

PRLA C-0126999:

Philip Jensen
F. H. and Iva Sheridan

CHAPTER 7

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APPENDIX A

APPLICANT'S PROPOSAL

APPENDIX A

APPLICANTS PROPOSAL

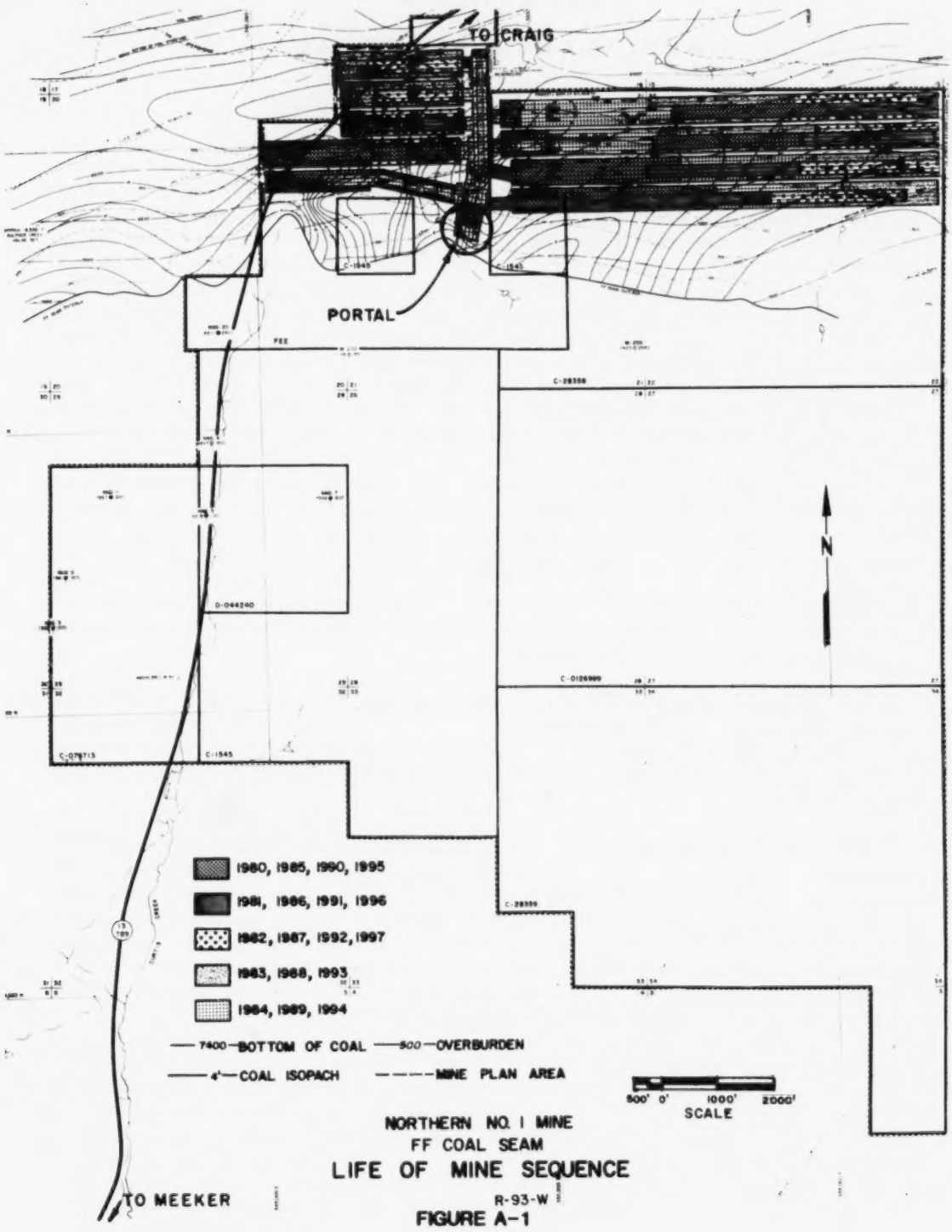
MINING

NCC's proposal consists of four underground mining operations. The Northern No. 1 mine would produce approximately 6,646,683 tons from 1980 through 1997 (fig. A-1). Production would be by continuous miner, shuttle car, and belt haulage to the surface. At maximum production, approximately 392,000 tons of coal would be produced each year. Northern No. 2 mine would begin operations in 1985 and build to maximum production of 980,000 tons per year in 1990. Mine operation would cease in the year 2005 with total life-of-mine production of approximately 16,170,671 tons (fig. A-2). Northern No. 3 mine would begin operation in 1988 and produce approximately 34,458,225 tons during the life of the operation (fig. A-3). Continuous miners, shuttle cars, and belt haulage with a long-wall mining unit would produce at the rate of 1,600,000 tons per year from 1991 through 2010. The Rienau No. 2 mine, which is currently operating, produces coal utilizing the continuous miner. shuttle cars, and belt haulage during the first 11 years of operation. In 1992 a long-wall unit would be added to increase production to approximately 1,300,000 tons annually. Approximately 26 million tons of coal would be produced from the Rienau No. 2 mine during its life (fig. A-4). Operations are expected to cease in 2008. The MRP indicates that approximately 650,000 tons of coal were produced in 1980 from the Northern No. 1 and Rienau No. 2 mines. Approximately 1 million tons of coal were expected to be produced in 1981 from the four underground mines. Table A-1 shows the respective annual coal production for each of these mines.

NCC proposes to use a simple room-and-pillar mining method. Development work and pillar work would be completed utilizing continuous miners and shuttle cars. The long-wall unit, which would be used in the Northern No. 2, No. 3, and the Rienau No. 2 mines, would be installed after development work is completed by the continuous miners.

NCC has proposed a subsidence control plan in the MRP because of expressed concerns with subsidence. This plan would most likely minimize subsidence that would cause material damage to the surface, to the extent technologically and economically feasible, so as to maintain the value and use of surface lands. The subsidence control plan includes a description of proposed mining methods, measures to be taken to prevent and/or mitigate effects of subsidence, and a detailed monitoring program to predict the effects of retreat mining in a small area between Curtis Creek and State Highway 13/789.

Other equipment associated with the mining operations would consist of roof bolters, rock dust equipment, personnel transport, and maintenance equipment In addition, ventilation and haulage equipment standard to underground coal mining operations would be included. Production equipment consisting of continuous miners, shuttle cars, roof bolters, and long-wall units would all to be electrically operated. Support equipment, such as supply tractors, mantrips, and lubrication vehicles would be diesel powered. Ventilation equipment, both on the surface and at each section, would be electrically powered. Haulage equipment consisting of panel conveyor belts and main conveyor belts would also be electrically powered.



NORTHERN NO. 1 MINE
FF COAL SEAM
LIFE OF MINE SEQUENCE
R-93-W

FIGURE A-1

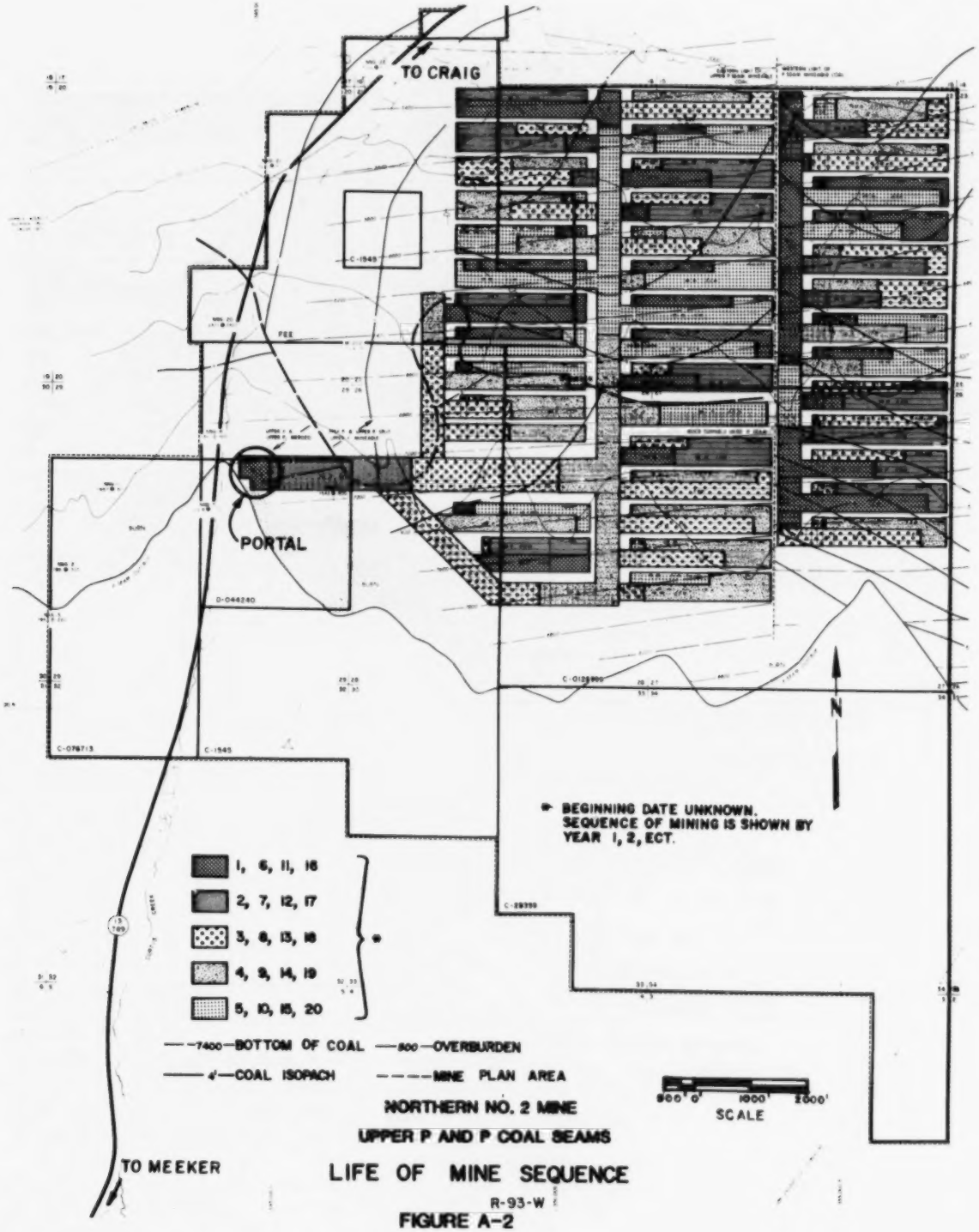
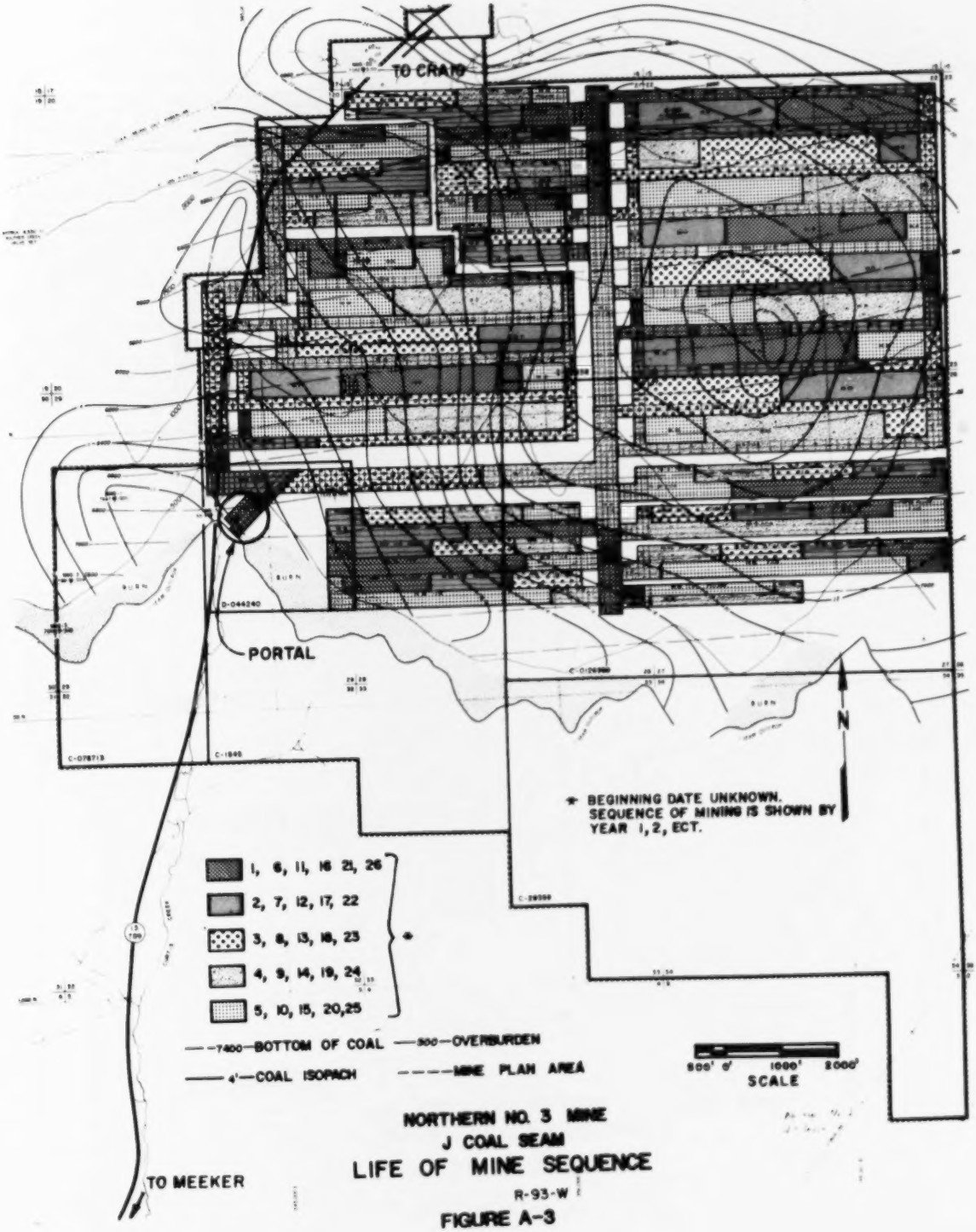

TO CRAIG
PORTAL
N
* BEGINNING DATE UNKNOWN. SEQUENCE OF MINING IS SHOWN BY YEAR 1, 2, ECT.
1, 6, 11, 16
2, 7, 12, 17
3, 8, 13, 18
4, 9, 14, 19
5, 10, 15, 20
*
7400—BOTTOM OF COAL
800—OVERBURDEN
4'—COAL ISOPACH
MINE PLAN AREA
500' 0' 1000' 2000'
SCALE
NORTHERN NO. 2 MINE
UPPER P AND P COAL SEAMS
TO MEEKER
LIFE OF MINE SEQUENCE
R-93-W

FIGURE A-2



NORTHERN NO. 3 MINE
J COAL SEAM
LIFE OF MINE SEQUENCE
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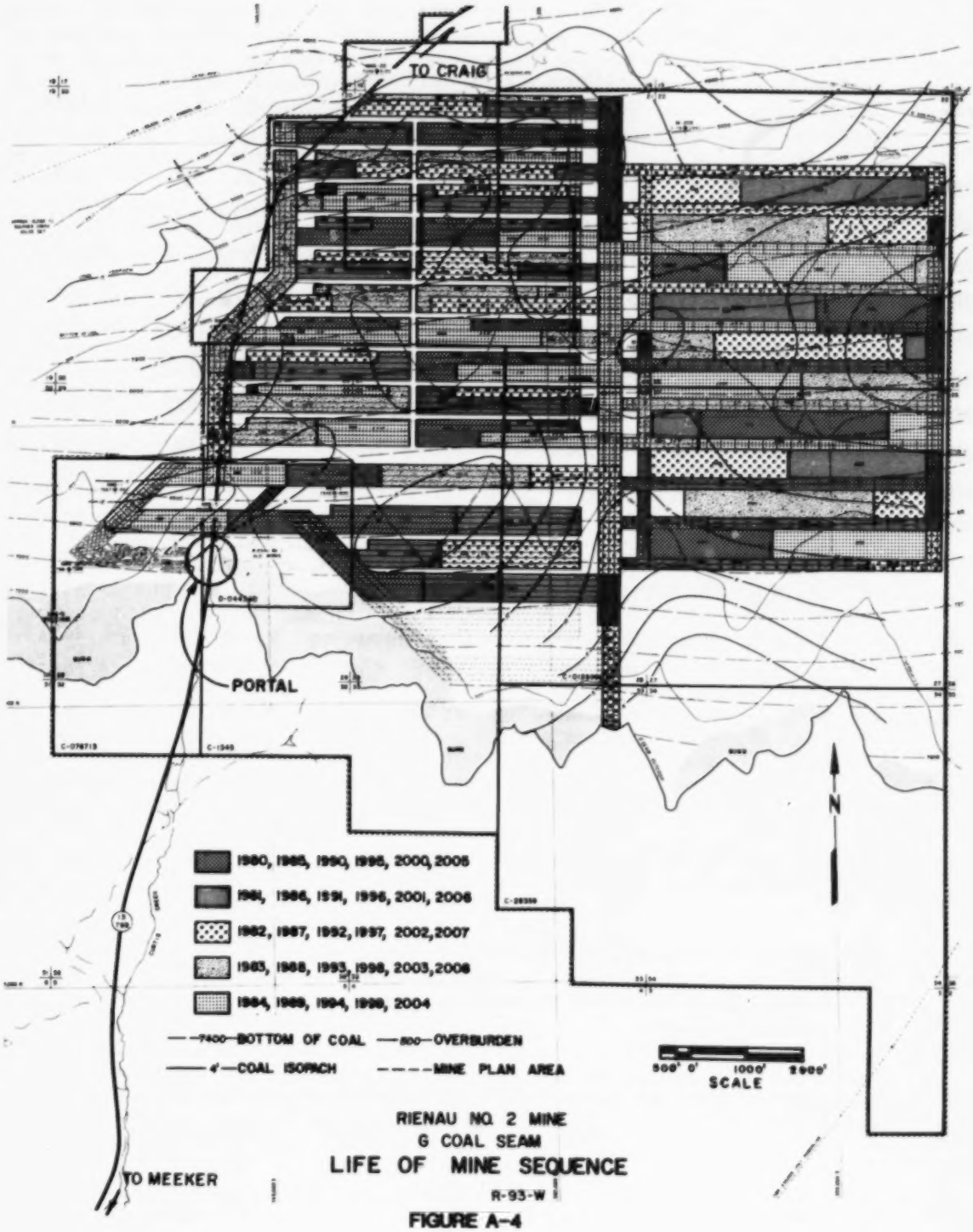
FIGURE A-3



RIENAU NO. 2 MINE
G COAL SEAM
LIFE OF MINE SEQUENCE

FIGURE A-4

TABLE A-1

COAL PRODUCTION (Tons)

Year	Northern No. 1	Northern No. 2	Northern No. 3	Rienau No. 2	Total
1980	286,683	-	-	367,500	654,183
1981	392,000	30,625	49,000	539,000	1,010,625
1982	392,000	189,875	260,325	539,000	1,381,200
1983	392,000	577,792	753,400	539,000	2,262,192
1984	392,000	973,875	1,573,500	539,000	3,478,375
1985	392,000	946,440	1,573,500	539,000	3,450,940
1986	392,000	980,000	1,573,500	539,000	3,484,500
1987	392,000	980,000	1,573,500	539,000	3,484,500
1988	392,000	980,000	1,573,500	539,000	3,484,500
1989	392,000	980,000	1,573,500	539,000	3,484,500
1990	392,000	980,000	1,573,500	539,000	3,484,500
1991	392,000	980,000	1,573,500	539,000	3,484,500
1992	392,000	980,000	1,573,500	1,304,000	4,249,500
1993	392,000	980,000	1,573,500	1,304,000	4,249,500
1994	392,000	980,000	1,573,500	1,304,000	4,249,500
1995	392,000	980,000	1,573,500	1,304,000	4,249,500
1996	392,000	980,000	1,573,500	1,304,000	4,249,500
1997	88,000	980,000	1,573,500	1,304,000	3,945,500
1998	-	947,584	1,573,500	1,304,000	3,825,084
1999	-	593,184	1,573,500	1,304,000	3,470,684
2000	-	151,296	1,573,500	1,304,000	3,028,796
2001	-	-	1,573,500	1,304,000	2,877,500
2002	-	-	1,573,500	1,304,000	2,877,500
2003	-	-	1,573,500	1,304,000	2,877,500
2004	-	-	1,358,000	1,304,000	2,662,000
2005	-	-	521,500	1,304,000	1,825,500
2006	-	-	46,000	802,902	848,902
2007	-	-	-	384,700	384,700
2008	-	-	-	254,592	254,592
TOTAL	6,646,683	16,170,671	34,458,225	25,994,694	83,270,273

Proposed surface ancillary facilities and equipment would consist of offices, shops, and warehouses normally associated with an underground mine operation. The ancillary facilities would consist of two existing mine offices and bath houses at the Northern No. 1 and Rienau No. 2 mines and a single truck loadout unit at the Rienau No. 2 mine. (See figures A-5 and A-6.) When the additional mining operations would be brought online in 1981 and 1982, a central office, shop, warehouse, and loadout would be constructed. All personnel would primarily operate out of the central office and shop facility.

Coal would be transported from the surface facilities to the Wilson-Loudy rail loadout, located approximately 35 miles north of the minesites, by haul trucks of approximately 25-ton capacity.

Mobile equipment required at the surface facilities during the mine operations would consist of front-end loaders, motor graders, crawler tractors, and hydraulic cranes and backhoes. Additional nonproductive support equipment, such as personnel trucks, supply trucks, forklifts, and engineering vehicles, would also be utilized where required.

A number of new haul and access roads would be required for transportation into and within the proposed mine areas. NCC has indicated that the haul road would be designed to meet the Federal and Colorado State standards.

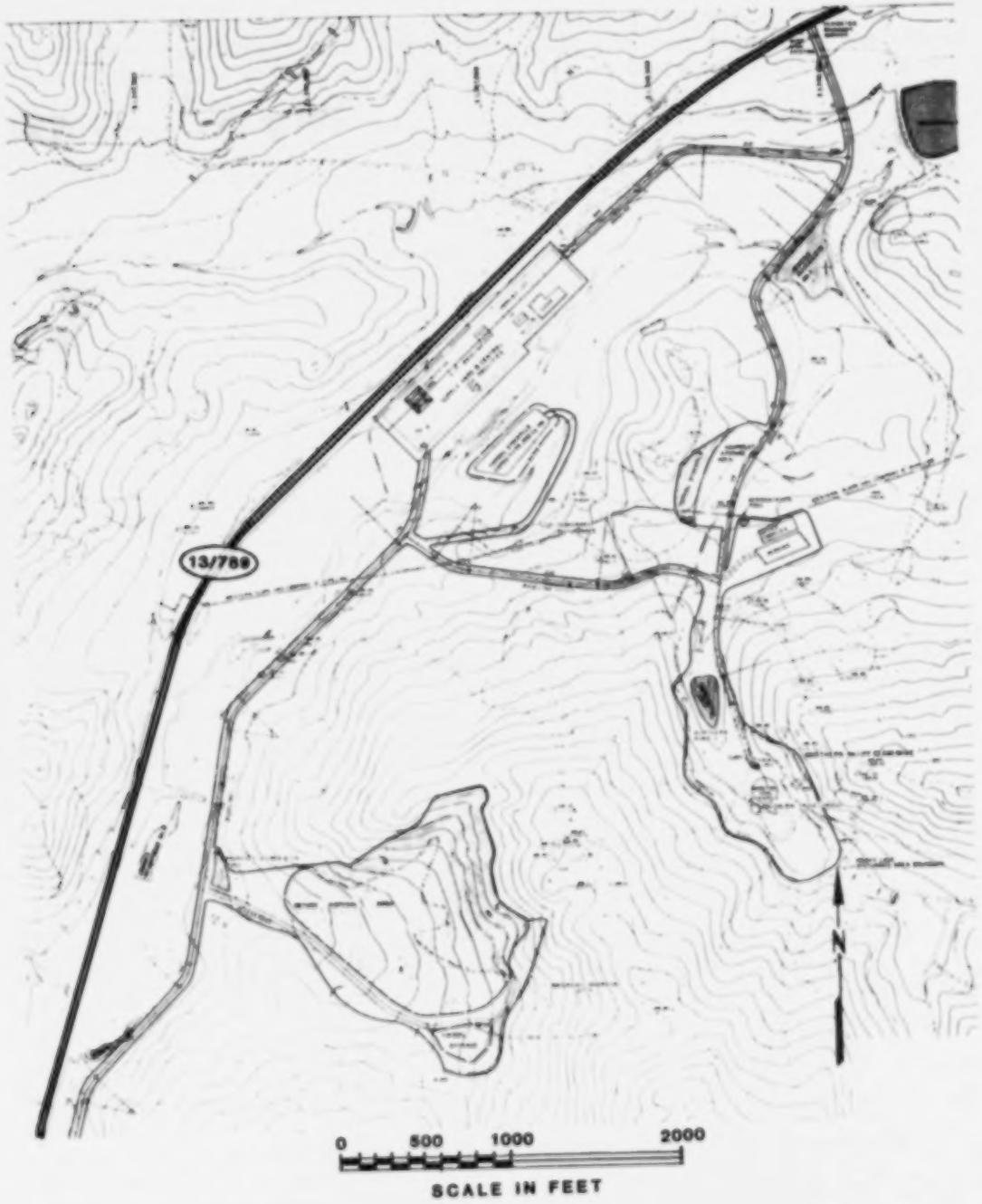
The Northern No. 1 mine would require a haul road which runs northward from the mine and connects with State Highway 13/789 (fig. A-5). The road would be about 1 mile long and would closely follow an existing main access road. The road would have 24-foot travelway from State Highway 13/789 to the coal loading area. At this point the road would split into a one-way coal loading loop that is 12 feet wide. The road would have an asphalt surface of 300 feet just before connecting to State Highway 13/789. This would be designed to prevent tracking of mud onto the State Highway 13/789 and to reduce maintenance costs in this area by eliminating the "washboard" surface. The remainder of the road would be surfaced with a compacted crushed rock material. The entire length of the gravel road would be treated with calcium chloride or similar dust-controlling agent. Ditches and culverts would be provided for surface runoff control.

Haul roads for the Northern Nos. 2 and Northern 3 mines, central shop and supply yard, and connectors to the Northern No. 2 mine haul roads are depicted in figure A-6.

All haul roads for the Rienau No. 2 mine have been constructed as approved by OSM, June 1, 1979, and the CMLRB, May 31, 1979 (Permit No. 78-345). No additional roads are anticipated to be constructed for the 5-year permit term.

The proposed Milk Creek rail loadout area requires a haul road approximately 1 to 2 miles long. This road would run between the loading loop area and State Highway 13/789. The road would have a 28-foot travelway with a compacted crushed-rock surface. Dust would be controlled by watering. Ditches and culverts would be provided for surface runoff control.

Upon completion of the mines, NCC proposes to reclaim roads within the mine area by removing the surface, regrading to meet surrounding contours, and



NORTHERN NO. 1 MINE SURFACE FACILITIES

AND REFUSE DISPOSAL AREA

FIGURE A-5

BASIN A

BASIN B

BASIN C

INTAKE MATERIAL

INTAKE TRENCH

SUB STATION

MATERIAL STORAGE

POND A

POND B

BATHHOUSE

RUNNING LOT

COAL STORAGE PILE

TRANSFER TOWER

OVERLAND CONVEYOR

AIR INTAKE

EXISTING RIEN

NORTHERN NO. 2 AND 3 MINES

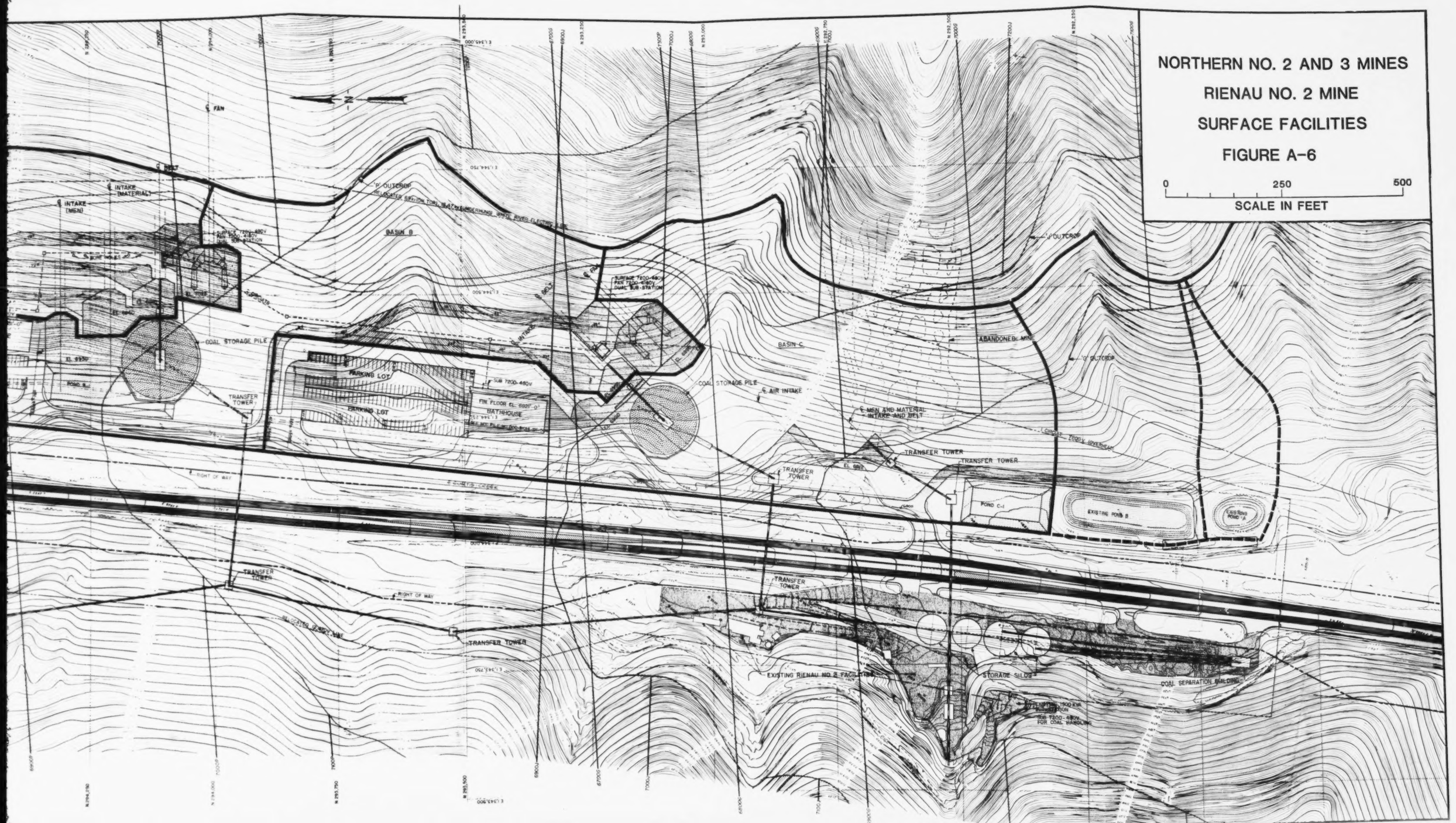
RIENAU NO. 2 MINE

SURFACE FACILITIES

FIGURE A-6

0 250 500

SCALE IN FEET



reseeding with an appropriate seed mixture. Equipment such as personnel trucks, supply trucks, forklifts, and engineering vehicles would also be utilized where required.

TOPSOIL PROTECTION

NCC conducted a soil survey during July and August, 1979. The soil map for the Northern No. 2 and No. 3 mine areas, including the refuse disposal area, central shop, supply area, and connecting roads to the Northern No. 1 mine area was adapted from the U.S. Department of Agriculture, Soil Conservation Service (SCS) Intensity III survey for Rio Blanco County. The SCS mapping was transferred from a map of 1 inch equals 2,000 feet (1:24,000) to a map 1 inch equals 200 feet (1:2400). Additional field mapping was conducted to refine the survey to Intensity I. The soil map and pedon soil descriptions are given in the MRP. (See table A-2.)

Acreages to be disturbed during the first 5 years of mining were not provided in the MRP. However, in a telephone conversation between Mr. Doug Chapin and Ms. Marlene Berg on July 28, 1981, it was stated that the acreage of the disturbed MRP land area for the 5-year period would be approximately 140 acres.

Table A-2.--Soil taxonomic classification

Soil series	Suborder and family	Classification
Straw	Cumulic Haploborolls	Fine-loamy, mixed
Dollard	Frigid Ustic Torriorthents	Fine, montmorillonitic
Shawa	Pachic Haploborolls	Fine-loamy, mixed
Burnette	Argic Pachic Cyroborolls	Fine, montmorillonitic
Redthayne (tentative)	Aridic Haploborolls	Fine-loamy, mixed
Mergel	Torriorthentic Haploborolls	Loamy-skeletal, mixed
Owen Creek	Argic Cyroborolls	Fine, montmorillonitic
Jerry	Argic Cyroborolls	Fine, montmorillonitic
Rhone	Pachic Cyroborolls	Fine-loamy, mixed
"Soil A"	Frigid Ustic Torriorthents	Fine-loamy, mixed

Soil Sampling and Analysis

Soil pedons were sampled in 1979 for at least one site for each soil series by Mr. Jim Walsh, Western Resource Development Corporation, Boulder, Colorado. These samples were taken by pedogenic horizon to a depth of 60 inches unless bedrock was encountered. The soil laboratory tests and analyses were performed in 1979 using standard procedures by Agricultural Consultants, Brighton, Colorado, in accordance with Wyoming State Department of Environmental Quality Guidelines.

Chemical and physical data were presented in the MRP. These data include: pH, electrical conductivity, saturation percent, calcium, magnesium, sodium adsorption ratio, boron, molybdenum, and selenium. In addition, particle size distribution analyses (texture classes) were also presented.

Suitability and Calculations of Soils for Reclamation

SCS standard guidelines were used to evaluate the various soil materials for use of topsoil. These criteria were given in the MRP, and include the chemical and physical properties listed in the previous paragraph.

In general, the soils in the study area are suitable for NCC's proposed uses. Disturbed areas include the following: the refuse disposal site; the support facilities, including the central shop and supply yard and connecting roads; and the mine portals.

The Shawa soil series would be the primary soil type used to cover refuse material. There are approximately 7.6 acres of Shawa soil mapped in the refuse disposal area. Since the upper 60 inches has a good rating and would be salvaged, this would supply approximately 38 acre-feet of good topsoil. The other three soils mapped in the refuse disposal site include the Jerry, Dollard, and Burnette. The upper 14 inches of the Burnette soil series has a good rating, whereas below 14 inches plus the entire solum of the other two soils have fair to poor ratings. However, 9.3 acres of Burnette soil were mapped, which would supply approximately 11 acre-feet of good topsoil. Thus, there would be a total of approximately 49 acre-feet of good topsoil to sufficiently spread 4 feet over the refuse pile and 2 feet over the remaining disturbed area for a total of 22.4 acres covered. Only a small proportion of this good topsoil will be placed in a stockpile, as most of it would be directly respread over the refuse material as needed.

The Straw soil series was the dominant soil type mapped for the areas proposed to contain the central shop and support facilities. The Straw soil has an overall rating of fair, primarily as a result of its susceptibility to erosion of the A horizon and its lower water-holding capacity and texture for the C horizons. Shawa soil series was also listed in the MRP as a soil to be disturbed in the construction of roads, and it would not appear to comprise a significant area as when compared to the Straw soil series.

Three soil series were listed in the MRP as those to be disturbed for the proposed Northern Nos. 2 and 3 mine portals. Two of these soils, the Straw and the Redthayne, have fair ratings, whereas the third, the Mergel, has a good rating for the upper 8 inches of A horizon and a fair rating for the next 22 inches (AC and C horizons).

Only two of the soils mapped in the MRP land area have horizons that have been designated as being poor. These include the Jerry and the Redthayne soil series. The Jerry has a thin A horizon of 6 inches of fair material, whereas the Redthayne has a thicker A horizon of 17 inches, rated as fair. The Jerry soil has a clay loam A horizon and clay subsoil horizon; this soil should not be used in reclamation. The percentage of coarse fragments is the limiting factor for the Redthayne; its use in reclamation should be minimal.

Topsoil storage for the Northern No. 1 mine was listed as 36,000 cubic yards. All of the previously disturbed soil has been placed in a stockpile according to the

applicant's approved topsoil storage plan for the Northern No. 1 mine (plan for topsoil stockpile was approved by CMLRB). The initial phase of the refuse disposal area required the placement of disturbed topsoil into two stockpiles. These stockpiles have been revegetated, and measures have been taken to minimize erosion. These stockpiles will be used to cover the refuse material upon completion of mining.

The topsoil from the central shop and supply yard was estimated to be 56,000 cubic yards. This stockpile would be protected from erosion by revegetation. Upon completion of mining, this stockpile would be used to reclaim the area disturbed during construction of the support facilities.

Removal Procedures

A rubber-tired scraper pan would be used to remove the topsoil. For the waste-disposal area, up to 60 inches of the Shawa soil would be stripped. This would be placed in a stockpile. As needed, the remaining soils would be stripped of topsoil and respread over the waste material according to the MRP and as given below. This topsoil removal would proceed at least 100 feet in advance of the waste placement.

Details for topsoil removal for the refuse stockpile as well as the support facilities area and the mine portals are presently being resolved between the applicant and CMLRB.

Redistribution Procedures

After the waste rock has been graded to the desire configuration and compacted to 80-90 percent of ASTM D698 maximum density, the topsoil would be replaced on the rough or furrowed spoil materials. The topsoil would be replaced by the use of rubber-tired scrapers or equivalent equipment in two lifts of approximately 12 inches each. The issue of 4 feet of nontoxic material covering the coal processing waste or other acid-forming or toxic wastes is presently being discussed and resolved between NCC and the CMLRB. A soil testing program will be used to determine levels of N, P, and K necessary to establish vegetative cover.

Details for topsoil distribution for disturbed areas other than the refuse stockpile are presently being resolved between NCC and CMLRB.

Stockpile Protection Procedures

All stockpiles would be placed on stable sites and protected from erosion using appropriate revegetation measures. After being graded to not more than a 5h/1v slopes, the area would be broadcast seeded with a mixture of grass species. Seeding would take place during the first favorable planting season following replacement of the topsoil. (See revegetation section of appendix A.)

BACKFILLING AND GRADING

After mining has ceased, all drill holes and adits would be sealed and covered. Proposed preparations for backfilling include dismantling and removing buildings, removing any coal debris or any other undesirable material from the area, and removing any culverts prior to grading. Diversion ditches would be removed as

part of regrading. The mine cut would be graded and backfilled to reduce the highwall. Earthwork to achieve final contours would involve several steps. Nowhere would a bench slope be allowed to exceed the steepness of the natural slopes in the area (2h:1v), so stability of the fill areas is assured. Soil in fill areas would be overcast from the bench and compacted to 95-percent proctor before the next overcast is made. A dozer would be used to accomplish this task. For those layers that become too narrow to grade along the contour, the dozer would move up and down the hill to blend the lifts. A registered engineer would supervise earth moving work to ensure compliance with applicable Federal regulations. Regrading slopes would be checked with a clinometer to verify slopes. Postmining contours are provided in the MRP.

Grading, preparation, and placement would be done in a manner which minimizes slippage. During the regrading, most of the material would be pushed more or less straight upslope. The bulldozer cleat marks would end up on the contour and would be important in retarding surface erosion. Surface relief would be 2 to 4 inches to ensure good adhesion of subsequently applied topsoil. In the event that residual roughness and cleat marks were not sufficient to produce 2 to 4 inches of surface relief, the slopes would be ripped. The packing action of the bulldozer tracks during regrading would adequately compact the regraded material.

Swell Factors and Supporting Calculations

NCC has not provided information in the MRP on the swell factors of excess cut material. In addition, stability calculations and analysis have not been provided. However, premining and postmining cross sections have been provided in the MRP for the disturbed area of the Northern Nos. 1, 2, and 3 mines.

Postmining Topography

Postmining cross-sections are shown in the MRP for all disturbed areas except the central shop area and the Northern No. 1 mine haul road. A reclamation plan for the Rienau No. 2 mine has been previously submitted by the applicant and approved by the regulatory authority.

NCC proposes to regrade and backfill all disturbed areas to approximate original contour except for the proposed Milk Creek rail loadout area.

NCC has stated that excess material derived from cuts in area of the Northern No. 2 and No. 3 mines would be used as fill in the supply yard and central facilities. A refuse disposal area would be utilized to permanently dispose of coal mining wastes and other excess cut material.

NCC states in the MRP that the Northern No. 1 Sedimentation Pond would not be removed but left in place as a stock pond as per preexisting design. Sedimentation ponds for the No. 2 and No. 3 mines would be removed.

REVEGETATION

NCC intends to initiate revegetation during the first fall season (September or October) after the cessation of mining. Seed would be planted during this time following the respreading of topsoil. Shrub transplant stock would be planted during the next fall season.

Seeding rates and mixtures would vary according to specific locations. The mine bench area would receive 47 lb/acre pure live seed (PLS) hand-broadcast. The facilities and sediment pond areas would be planted by drilling at a rate of 23.5 lb/acre PLS or broadcast at a rate of 47 lb/acre PLS. The haul road area would be drill-seeded at a rate of 23.5 lb/acre PLS. An intercept ditch has been broadcast seeded with 5 lb/acre PLS of reed canary grass.

Tables A-3, A-4, and A-5 identify 14 species of perennial grasses to be seeded into disturbed areas. Native forbs and shrubs are also included in the seed mixes.

Table A-3.--Seed mix for mine bench, facilities, and sediment pond areas

Species	Common name	Rate (pure live seed)
Agropyron dasystachum	Thickspike wheatgrass	8
Agropyron intermedium	Intermediate wheatgrass	2
Agropyron riparium	Streambank wheatgrass-Sodar	8
Agropyron smithii	Western wheatgrass-Rosana	8
Agropyron trachycaulum	Slender wheatgrass-Primar	8
Alopecurus pratensis	Meadow foxtail	0.1
Bromopsis inermis	Smooth brome-manchar	1
Dactylis glomerata	Orchardgrass-Latar	0.5
Elymus cinereus	Basin wildrye	2
Festuca rubra	Red fescue-Pennlawn	4
Festuca thurberi	Thurber fescue	3
Poa ampla	Big bluegrass-Sherman	3
Poa compressa	Canada bluegrass-Reubens	0.4
Native forbs	Native forbs	1
	Total lbs pure live seed/acre	47

Shrub transplant stock would be placed on slopes steeper than 2.5:1. Species of containerized shrubs include Gambel oak, serviceberry, black chokecherry, snowberry, and Wood rose. (See table A-6.)

Four of the herbaceous species are non-native nonadapted varieties. Proper justification for the use of these species has not been given by NCC.

These species include foxtail (Alopecuras pratensis), smooth brome (Bromopsis inermis), orchard grass (Dactylis glomerata) and white Dutch clover (Trifolium repens). One adapted species, intermediate wheatgrass (Agropyron intermedium), has also been suggested for use.

The mine bench area would be covered with an erosion control blanket. All other areas would be mulched with clean straw, disked and crimped, at a rate of 1.5 tons per acre.

Table A-4.--Upland and sideslope seed mixture for temporary and final vegetation

Species	Common name	Rate (pure live seed)
	Forbs	
Archillea lanulosa	Western yarrow	0.1
Artemisia frigida	Fringed sage	0.1
Aster chilensis	Aster	0.1
Aster glaucodes		
Aster occidentalis		
Balsamorhiza sagittata	Arrowleaf balsamroot	1.0
Chamerion angustifolium	Fireweed	0.1
Hedysarum boreale	Utah sweetvetch	1.0
Linum lewissi	Blue flax	0.5
Penstemon strictus	Mountain penstemon	0.5
Sphaeralcea coccinea	Scarlet globemallow	0.5
Thermopsis montana	Golden banner	0.5
	Grasses	
Agropyron smithii	Western wheatgrass	6.0
Agropyron spicatum	Bluebunch wheatgrass	6.0
Agropyron trachycaulum	Slender wheatgrass	5.0
Bromus carinatus	Mountain brome	4.0
Bromus marginatus		
Elymus cinereus	Basin wildrye	4.0
Elymus glaucus	Blue wildrye	2.0
Oryzopsis hymenoides	Indian ricegrass	2.0
Poa ampla	Big bluegrass	2.0
Poa compressa	Canada bluegrass	1.0
Stipa comata	Needle-and-thread	2.0
Stipa viridula	Green needlegrass	2.0
Koeleria macrantha	Prairie Junegrass	1.0
	Shrubs	
Rosa woodsii	Woods rose	1.0
Symphoricarpos oreophilus	Snowberry	1.0
	Total lbs pure live seed/acre	43.4

Table A-5.--Seed mix for roads

Species	Common name	Rate (pure live seed)
Agropyron dasystachum	Thickspike wheatgrass	8
Agropyron intermedium	Intermediate wheatgrass	2
Agropyron riparium	Streambank wheatgrass-Sodar	8
Agripyron smithii	Western wheatgrass-Rosana	8
Agropyron spicatum	Bluebunch wheatgrass	5
Agropyron trachycaulum	Slender wheatgrass-Primar	6
Artemisia tridentata vaseyana	Vasey big sagebrush	0.5
Chrysothamnus nauseosus	Rubber rabbitbrush	0.5
Elymus cinereus	Basin wildrye	2
Poa ampla	Big bluegrass-Sherman	2
Symphoricarpos oreophilus	Mountain snowberry	4
Native forbs	Native forbs	1.0
	Total lbs pure live seed/acre	47.0

Table A-6.--Shrub transplants for final revegetation

Species	Common name	Density (individuals/ acre)
Amelanchier utahensis	Utah serviceberry	900
Cerocarpus montanus	Mountain mahogany	110
Prunum virginiana	Chokecherry	50
Purshia tridentata	Antelope bitterbrush	50
Quercus gambelli	Gambel oak	650
Rhus aromatica	Skunkbrush sumac	50
Ribes cereum	Wax currant	60
	Total	1,870

Revegetated areas would be protected from livestock grazing for a minimum of 3 years following planting. As indicated, additional time may be required to assure successful establishment of vegetation without grazing pressures. A sheep-tight fence would be constructed around the lease area. Twelve-inch spacing between barbed-wire strands would reduce potential for entangling wide ungulates.

AIR RESOURCES PROTECTION

Monitoring

NCC proposes to continue their meteorology and air quality monitoring program discussed in the MRP at such time as construction activities begin.

Air Quality Permits

The State Air Quality Permit Applications for the Northern Nos. 2 and No. 3 mines have not yet been submitted by NCC. However, air quality permits do exist for the Northern No. 1 and Rienau No. 2 mines and are on file at the Colorado State Department of Health, Air Pollution Control Division.

Fugitive Dust Control Plan

NCC has proposed the following control measures:

- Haul roads will be watered as necessary.
- Coal, rock, soil, and other dust forming debris will be removed from the road or compacted frequently.
- Disturbed areas will be revegetated frequently or otherwise stabilized as soon as practical after they have been disturbed.
- The coal conveyors will be covered.
- The overflow stockpiles will be watered as necessary.
- Coal will be stored in silos.
- All transfer points in the system will be covered or contained in a manner acceptable to the State Air Pollution Control Division.

APPENDIX B

THE FEDERAL COAL MANAGEMENT PROGRAM

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In May 1977, U.S. Department of the Interior (DOI) established a new Federal coal leasing program to assure the leasing and production of sufficient Federal coal to meet American energy needs while protecting other valuable natural resources such as wildlife, recreation areas, and agricultural land.

By law, Federal coal can only be made available in significant amounts through a process of competitive leasing. Competitive and preference right leasing of Federal coal were halted in 1971 because the then-existing leasing program had led to the leasing of substantial amounts of Federal coal, but had not resulted in increased production of coal. A 1975 effort to renew competitive coal leasing failed because of an inadequate environmental impact statement. Critics, including the State governments of those western states where most Federal coal is located, charged that the 1975 program, known as EMARS (Energy Minerals Activity Recommendation System), did not adequately consider how to select coal leasing areas that would minimize damage to farms, ranches, and the lands and waters that are most important to people and wildlife in the West.

In 1976, Congress passed the Federal Coal Leasing Amendments Act of 1976 (FCLAA), establishing specific rules to guide the development of Federal coal. In that same year, Congress enacted the Federal Land Policy and Management Act (FLPMA) requiring that the Bureau of Land Management (BLM) and the DOI ensure that all Federal resource development decisions on public lands, including coal leasing, are made in cooperation with State and local governments as part of a comprehensive planning process.

In September 1977, a Federal court, acting on the lawsuit filed against the 1975 program, ordered that the program be halted until, as required by law, the possible environmental impacts could be described adequately. By this time, the Secretary of the Interior had already taken the first steps to develop a new and better system for leasing Federal coal. In April 1979, the BLM published a new, comprehensive environmental impact statement which analyzed the new preferred program for managing Federal coal as well as alternative management options.

The Secretary, after studying the environmental analysis, made final decisions about the design of the new program in June 1979. Regulations (43 CFR 3400) putting the program in operation were issued July 19, 1979. The new program incorporates the requirements of the laws enacted in 1976, as well as the 1978 amendments to the FCLAA. Because of the greater efforts by the Department in analysis and in public participation, the new program is expected to remain free of the judicial restraints such as those that crippled the 1975 program.

The new program is supported by the western states which had objected to the earlier EMARS. For the first time in nearly a decade, Federal coal will be made systematically available for competitive leasing to meet America's coal needs.

I. INTRODUCTION

The Federal coal management program combines all major coal responsibilities of the Secretary of the Interior into one unified program in order to:

A. Give the Nation greater assurance of being able to meet its national energy objectives.

B. Provide a means to establish a more desirable pattern of coal development.

C. Offer significant administrative advantages for the DOI.

D. Increase competition in the coal industry.

The eight major elements of the new Federal coal management program are:

A. A planning system involving two steps: (1) land use planning, which includes close consultation with State and local governments, industry, and the public to decide which areas of Federal coal reserves will be considered potentially acceptable locations for coal production; and (2) activity planning to delineate, rank, and select for sale specific tracts of coal.

B. A system for evaluating the future national need for coal and for determining where production should be stimulated by the leasing of Federal coal.

C. Procedures for conducting sales and issuing leases.

D. Procedures for post-least enforcement of terms and conditions.

E. Procedures for managing existing leases.

F. Procedures for processing existing preference right lease applications.

G. A strategy to integrate the environmental analysis requirements of the National Environmental Policy Act of 1969 into the new program.

H. Plans for a smooth start-up of the new program and, under limited circumstances, for offering lease sales in response to applications.

The major coal bearing areas of the continental United States have been divided into 12 coal regions. Eight of these regions contain significant reserves of Federal coal. These eight coal regions seve as the basic units

both on which the asessment of target levels for leasing will be centered and in which tracts will be ranked, selected, and scheduled for sale under the new Federal coal management program.

The following summary provides the reader with a basic overview of how the Federal coal management program will proceed in the eight regions containing significant amounts of Federal coal reserves and in areas outside of those eight regions.

II. STATE, PUBLIC, AND INDUSTRY PARTICIPATION

A variety of methods have been developed to provide for State, local, and industry participation in the Federal coal management program.

State Participation. States will be offered the opportunity to sign cooperative agreements which will enable them to participate directly in the land use planning process. The States may also recommend criteria to be added to the list of Federal unsuitability criteria and they may submit expressions of interest in potential coal tracts. Furthermore, a special consultation step will be provided to the States in setting regional production goals and leasing targets. The Governor will be consulted prior to any final decision to offer a tract for sale. The States will be asked to provide their views over the full spectrum of issues, including the interregional and cumulative regional social and economic impacts of coal development.

The States will be expected to participate actively and directly along with BLM personnel through membership on regional coal teams. Whenever possible, the regional coal teams serve as the general forum in which State participation occurs. In particular, these teams are the focal point for developing proposals and recommendations for Secretarial decision on the tracts selected and scheduled for sale and on regional production goals and leasing targets.

The activities of these teams provide the State Governors with an opportunity to discuss any potentially significant Federal decisions before they are made. The teams provide the citizens of each State, through their elected officials, with an authoritative forum for the airing of all interests and concerns.

General Public Participation. The public has several opportunities to participate directly and throughout the coal management decisionmaking process. Mandatory hearings are held on the land use plan recommendations either before final land use plan decisions are made or after draft regional environmental impact statements are completed. Comments will be solicited from the public at the beginning of the regional tract ranking, selection, and sale scheduling process. The public will have the opportunity to submit written comments and to participate in hearings on the regional lease sale environmental impact statement. The Secretary can also hold additional hearings if there is a general interest in the proposed sale and any issue exists which had not been thoroughly discussed at previous hearings. Besides the general public participation ateps, there will be opportunities for

participation during the surface owner consultation and consent process.

In addition to these formal opportunities for public participation, anyone can submit general comments at any time in the process. When the Department believes it will serve the public's interest, additional public comment meetings will be held.

Industry Participation. Industry will bid for and produce the Federal coal, and industry can provide information to help determine where and when Federal coal should be leased. Industry participation will assure the earliest and most efficient production of all coal being developed in any given region.

Since industry is one of the three principal sources for coal information in the United States, industry is in a special position to make the Federal Government aware of the type, quality, quantity, and location of coal which should be considered for leasing. Industry can participate in the land use planning process and in the setting of DOI's regional production goals and leasing targets through all the same formal and informal channels available to the general public.

During land use planning, the coal industry can help identify high or medium potential coal resources; an area will be considered for further study if it is shown by company data to contain coal of medium potential for development. Industry will also be asked to explain why coal production in a particular area would be important enough to reduce or eliminate other resource uses. Mining companies may provide data (for example, about innovative mining or mitigation techniques) which could permit exceptions to the application of the unsuitability criteria. During the setting of regional production goals and leasing targets, industry can supply information on the overall demand for coal and on the extent to which the production potential from previously leased Federal reserves and non-Federal reserves will meet that demand.

III. SETTING REGIONAL GOALS AND LEASING TARGETS

The Secretary's June 1979 decisions included several decisions on regional leasing needs. Because circumstances determining the Nation's need for coal may change, coal forecasts are not often precise enough to permit competitive leasing on the basis of a single assessment of leasing needs. Therefore, a periodic reassessment of coal needs is incorporated as an integral part of the leasing system. The reassessment is conducted in a process which merges Department of Energy (DOE) regional production goals with advice from State and local governments, the coal industry, and other interests to determine leasing targets. The regional targets established by the Secretary are used by the regional coal teams at the point of regional tract selection to ensure that enough tracts are made available to meet target production levels.

The DOE focus is primarily on the energy needs of a healthy national economy and on national energy policy goals. DOE will consider the role of coal production in meeting those goals. In the goal and target setting process, the Secretary of Energy submits proposed DOE regional production goals to

the secretary of the interior. The supporting material for these proposed goals might include an indication of probable need for coal by major type. In determining regional goals for specific types of coal, the Secretary of the Interior is guided mainly by industry expressions of interest submitted at the start of the activity planning process.

The Secretary of the Interior will, within 60 days, comment to the Secretary of Energy on any potential conflicts or problems which the Interior Department foresees in the proposed DOE regional production goals. These comments will be based on the Interior Department's responsibilities for the management, regulation, and conservation of natural resources; the capabilities of Federal lands and Federal coal resources to meet those goals; and the national need for the coal, balanced against the environmental consequences of its development.

Within 30 days after receiving the Secretary of the Interior's comments, the Secretary of Energy will transmit to DOI final DOE national and suggested regional coal production goals. The secretary of the Interiuor will then look to the expertise and viewpoints of the regional coal teams as the major source of information and comment on the final DOE regional production goals and how they may affect leasing strategies and decisions. The Secretary will transmit the relevant DOE goal to each team. The team, in turn, will analyze the goal on the basis of its tract ranking and selection experience, its detailed knowledge of the region, and public comments it receives on the goal after publication in the Federal Register and, possibly, a hearing in the region. The team will report to the Secretary any adjustments it feels are necessary in the relevant DOE regional production goal and the reasons for those adjustments. The team will also provide the Secretary with a suggestion for a regional leasing target (on a reserve tonnage basis) for the next 4 year period.

Based on the recommendations of the teams and other information available to him, the Secretary of the Interior will adopt the final DOE regional production goals, either without change or after making adjustments to them. He will transmit the final goals to the Secretary of Energy and publish them in the Federal Register. The adopted goals will be used by the Department for long range coal management program planning, and will be made available to the States, local governments, and other entities for their use. The Secretary of the Interior will also adopt and publish, at the same time, preliminary regional leasing targets for logical mining units which would be composed of, or include, new Federal leases.

These preliminary regional leasing targets primarily reflect the difference between desired levels of production in the region without new Federal leasing. Federal and non-Federal coal that enters production because of past Federal leasing will also be considered in reaching the targets. Among other factors which may be affected by leasing decisions and which the Secretary considers in establishing preliminary regional leasing targets are competition within the industry and environmental problems associated with the existing pattern of leases and mines in each region.

The Secretary may call a national conference of the regional coal teams to discuss their individual recommendations. After publishing the final regional production goals and the preliminary regional leasing targets, the Secretary will consult directly with the Governors of the affected States to learn their views, particularly with respect to the relationship between the preliminary regional leasing targets and potential social and economic effects on the States and regions. After reviewing the information received through all of the above procedures, the Secretary will publish the final regional leasing targets in the Federal Register and transmit them to the regional coal teams.

The final regional production goals, and the preliminary and final regional leasing targets are used by the Federal and State Governments to set data gathering and planning priorities. This ensures that a sufficient number of tracts will be delineated in the future and that adequate site-specific information will be available to make the coal leasing process workable. The final regional leasing targets specifically guide the regional coal teams in the selection and ranking of tracts and assist them in the long range scheduling of proposed lease sales in their respective regions.

The regional tract ranking and selection process indicates the optimum tracts for the desired level of development and leads to analyses of the impacts of alternative lease sale schedules. These analyses can include alternatives for choosing a combination of tracts which will result in a leasing level above or below the level called for in the final regional leasing target for a particular region. Reasons for proposing leasing above or below the level called for in the final regional target are: (a) new information about industry interests; (b) special concerns of local communities or regions; (c) interest in special opportunity sales; (d) sales experience with the ongoing regional lease sale schedule; and (e) a desire on the part of a State to shift or disperse coal development patterns.

Any proposed Divergence above or below the final regional leasing target proposed by the regional coal team will be discussed and explained in detail in the draft regional lease sale environmental impact statement. Public comment will be specifically requested on the proposal in the public participation process. The secretary will specifically consider the analysis and any comments on the proposed divergence from the leasing target at the time he makes his decision on a lease sale schedule. In any case, an alternative which satisfies the regional leasing target must be considered.

The first time the process of determining regional leasing targets is conducted, the interregional analysis included in the programmatic environmental impact statement will be used as a basis for the decisions on the targets after providing for State consultation and public comment. The possibility of trade-offs in production goals and leasing targets between regions will be considered during the biennial process in which the production goals and leasing targets are set or revised.

In subsequent biennial revisions of regional production goals and leasing targets, information and analyses generated in the preceding regional tract ranking and selection process will provide useful information for the goal and target decisions. Those highly rated, but previously unselected, tracts will most likely serve as a pool for the selection of trcts to meet new regional production goals and leasing targets. If unchosen tracts remaining in one region are clearly superior to most of those remaining in another, interregional trade-offs in the setting of the new regional production goals will be considered. This overall interregional analysis of the tracts makes the development of regional production goals at this stage important. Biennial regional leasing targets derived from production goals will be used for either guiding new 4 year lease sale schedules or amending existing lease sale schedules after the first 2 years of their 4 year term.

IV. LAND USE PLANNING

The principal coal resource decision in land use planning is to determine where, from among the millions of acres of Federal coal lands, increased coal production will meet energy needs without unduly damaging agriculture, wildlife, recreation, or other resources and resource uses. These areas are identified by studying all Federal coal lands and determining which are most suitable for coal development.

A. Areas will be considered for leasing only if they have a high to medium coal development potential as determined by the Minerals Management Service.

B. Some lands containing Federal coal will not be considered for leasing if they are judged unsuitable under criteria which are designed to protect the most environmentally sensitive lands.

C. Areas where leasing may take place will not include lands where other resources or uses are determined to be more important than coal production.

D. Where the Federal Government owns the coal, the coal would be surface mined and the land above the coal is owned by ranchers or farmers who are qualified surface owners, the coal will not be leased without the consent of the qualified landowner. Where surfce mining of Federal coal would affect several landowners, a decision not to lease may be made if consultation with these surface owners shows a strong preference against coal development in the area.

The Department of the Interior currently estimates that 75 percent of the medium and high potential coal areas will remain in land use plans as areas acceptable for further consideration for coal leasing.

All potential resource users--such as ranchers, coal companies, other mineral producers, timber purchaseers, and the general public--will have the opportunity to participate actively in the land use planning process.

What follows is an explication of the four steps or "screens" listed above.

High to Moderate Coal Potential. Only a portion of the coal resources within an area covered by a land use plan is likely to be potentially economic to mine. Rather than perform detailed studies of lands containing no economic coal, coal leases will be issued only within known recoverable coal resource areas (KRCRA's).

The major source of information for this determination will be the coal resource occurrence/coal development potential (CRO/CDP) maps and other related data made available by the Geological Survey. Coal companies, the States, or members of the public may submit coal geological and economic data during this early phase of planning. Where the information demonstrates at least a medium development potential for coal, the area will be considered for further review; otherwise, the land will not be considered further for coal leasing during the life of the land use plan or the updated plan.

Unsuitability Criteria. President Carter, in a May 24, 1977, memorandum, instructed the Secretary of the Interior to lease "only those areas where mining is environmentally acceptable and compatible with other land uses." The President further directed that the Department "scrutinize existing Federal coal leases and preference right lease applications to determine whether they show prospects for timely development in an environmentally acceptable manner, taking steps as necessary to deal with non-producing and environmentally unsatisfactory leases and applications.

In addition, the Surface Mining Control and Reclamation Act of 1977 (SMCRA) required the Secretary to review Federal lands to determine whether they contain areas which are unsuitable for all, or certain types of, surface coal mining operations. SMCRA also contains a requirement for the States to undertake a similar program for non-Federal lands if they wish to assume primary regulatory authority under the Act. A list of standards to be used by the States is identified in Section 522 (a)(3) of the Act. These same standards must also be applied to Federal lands as well as private surface lands overlying Federal coal.

Criteria have been developed to implement SMCRA, other Federal laws, and the directives in the President's Environmental Message of May 23, 1979. The criteria, applied to medium and high potential coal lands, will aid the land managers in identifying those areas with key features, principally environmental, that cannot properly be protected if subjected to mining. These areas will not be given further consideration in the coal leasing planning process unless it is determined that stipulated methods of mining will provide adequate protection. Application of the unsuitability criteria will ensure that protection of the most sensitive and valuable environmental features of Federal lands is accomplished in a consistent, uniform, and objective manner so that coal development planning will be concentrated in areas where environmental conflicts are less likely to add delay, cost, or conflict to production efforts.

The unsuitability criteria can be divided into two categories: those which are required under Section 522 of SMCRA or other law (e.g., Federal land

system) and those which are discretionary under Section 522 or other law (e.g., land used for scientific studies.)

The unsuitability criteria will be fully applied during land use planning. The responsible official does not have the discretion to refrain from applying any criterion, but does have authority to decide that, in some cases, coal production can proceed without damaging the resources protected by the unsuitability standards.

The unsuitability criteria will not be applied to Federal lands which will be mined by underground mining methods unless such mining will produce surface effects on Federal lands to which a criterion applies. Surface effects include disturbance to surface occupancy, subsidence, fire, and other detrimental environmental impacts of underground mining which are manifested in the surface.

Specific exemption reflecting valid existing rights or substantial legal and financial commitments are incorporated, where appropriated, into the unsuitability criteria.

The unsuitabiliity criteria (exceptions and exemptions not listed) protect the following lands and resource values:

A. All Federal land included in the following land systems or categories: National Park System, National Wildlife Refuge System, National System of Trails, National Wilderness Preservation System, National Wild and Scenic Rivers System, National Recreation Areas, lands acquired with money derived from the Land and Water Conservation Fund , National Forests, and Federal lands in incorporated cities, towns, and villages.

B. Federal lands within rights-of-way or easements or included in surface leases for residential, commercial, industrial, or other public purposes, or federally-owned surface used for prime agricultural crop production.

C. Lands within 100 feet of the outside line of the right-of-way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community, or institutional building.

D. Federal lands designated as wilderness study areas and under review by the Administration and the Congress for possible wilderness designation.

E. Scenic Federal lands designated by visual resource management analysis as Class I (areas of outstanding scenic quality or high visual sensitivity).

F. Federal lands under permit by the surface management agency that are being used for scientific studies involving food and fiber production, natural resources, or technology demonstrations and experiments (except where mining could be conducted in such a say as to enhance, not jeopardize, the purposes of the study).

G. All districts, sites, building, structures, and objects of historic, architectural, archaeological, or cultural significance on Federal lands which are included in, or eligible for, inclusion in the National Register of Historic Places, and an appropriate buffer zone around the outside boundary of the designated property.

H. Federal lands designated as natural areas or as National Natural Landmarks.

I. Federally-designated critical habitat for threatened or endangered plant or animal species and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented.

J. Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a State pursuant to State law as endangered or threatened.

K. An active bald or golden eagle nest site site on Federal lands and an appropriate buffer zone around the nest site.

L. Bald and golden eagle roost and concentration areas on Federal lands used during migration and wintering.

M. Federal lands containing an active falcon (excluding kestrel) cliff nesting site and a buffer zone of Federal land around the nest site.

N. Federal lands which are high priority habitat for migratory a bird species of high Federal interest on a regional or national basis as determined jointly by the surface management agency and the Fish and Wildlife Service.

O. Federal lands which the surface management agency and the State jointly agree are fish and wildlife habitat for resident species of high interest to the State and which are essential for maintaining these priority wildlife species.

P. Federal lands in riverine, coastal, and special floodplains (100-year recurrence interval).

Q. Federal lands which have been committed by the surface management agency to use as municipal watersheds.

S. Federal lands identified by the surface management agency, in consultation with the State in which they are located, as alluvial valley floors where mining would interrupt, discontinue, or preclude farming.

T. Federal lands in a State to which is applicable a criterion (1) proposed by taht State and (2) adopted by rulemaking by the Secretary.

The unsuitability criteria will be applied to new leases, as well as preference right lese applications. The criteria will be applied directly to the tract areas for the latter. For all other new leases, the procedures set forth below will be followed.

The responsible official of the Federal surface management agency will describe in the land use plan the results of the application of each of the unsuitability criteria to the medium and high potential coal lands in the planning area. Each instance in which a criterion is found to be applicable must be identified and the area which is excluded from further coal development consideration must be shown. If it is determined that conditions for an exception exist, the area to which the exception applies will be described, with discussion in detail of the reasons why the exception is being made, and what type of stipulations will be required in the lease or mining permit to ensure protection of the resource value covered by the criterion.

All coal lands not identified as unsuitable for all types of coal mining operation will be considered further in the land use planning process. Where underground mining of Federal coal will produce hydrologic or surface effects on land to which an unsuitability criterion applies, those lands will be considered unsuitable unless the conditions exist to permit an exception.

The unsuitability criteria will be applied to each existing non-producing lease upon submission of a mine plan by the lessee. The mine plan will be reviewed in light of the unsuitability criteria to determine which, if any, apply. If a criterion applies, the Department will evaluate whether the plan must be changed to eliminate the harmful effects which the criterion is designed to prevent. If no change can be made and some or all types of mining cannot take place consistent with the criterion, the Department will decide if it has the authority to apply that creiterion to the lease. If the lessee has valid existiang rights or has made substantial legal and financial commitments, the lease may be exempted, by statute, from complying with certain of the criteria depending on the cource of authority for the criteria and the dates of commitments. If the Department finds that it has the authority to apply the criterion, mining will not be permitted.

SMCRA mandates that the Secretary of the Interior review all Federal lands for unsuitability, and allows citizens to petition for and against designation of lands as unsuitable. Consequently, under SMCRA, the Department has procedures to apply unsuitability criteria both as part of a comprehensive Federal lands review and as part of a petition process.

The Office of Surface Mining (OSM) has the responsibility to administer the statutory petition process. OSM will only make a formal designation of Federal lands as unsuitable in response to a petition to designate under Section 522(c) of SMCRA. Anyone can submit either of two kinds of petitions. One is a petition to designate land unsuitable for mining. The other is a petition to terminate a designation of unsuitability. Section 522 of SMCRA requies that the petitioner be adversely affectee by potential mining of the lands in question and provide facts supporting the allegation. Petitions

submitted to OSM will be reviewed and forwarded with recommendations to the authorized surface management agency (e.g., BLM). A public hearing will then be held to present to the public the reviews of the OSM and the surface management agency. These reviews will describe (1) potential coal resources of the area; (2) the demand for coal resources; and (3) the impact of such designation on the environment, the economy, and the supply of coal. A decision to designate land unsuitable, to reject the petition, or to terminate a prior designation will occur within 60 days of the hearing.

Multiple Use Resource Management Decisions. Although many major conflicts between coal and other resources will be addressed during the application of the unsuitability criteria, some significant resource-balancing decisions will remain. These other resource trade-offs will be considered and acted upon after application of the unsuitability criteria. This stage in the land use planning process will determine the site-specific resource values or uses of greater importance than coal development. This process will also determine when other resources and uses (e.g., grazing, recreation, community development) may be temporarily or permanently reduced to allow for coal leasing and production.

Surface Owner Consultation. Section 714(d) of SMCRA requires the Secretary to consult during the planning process with private owners of the surface estate overlying Federal coal being considered for leasing. In order to minimize disturbance to land owners from surface coal mining of Federal coal deposits and to assist in the preparation of comprehensive land use plans required by the Mineral Leasing Act of 1920, as amended, the Department will, to the maximum extent practicable, refrain from leasing coal deposits for development by methods other than underground mining in areas where a significant number of qualified surface owners state a preference against the offering of deposits for lease. Although portions of these areas might still be designated as acceptable for further consideration for coal leasing, the land use plan will contain the recommendation that no leasing take place in the areas unless there are no acceptable alternative local areas available to meet the leasing target for the entire coal region.

V. OTHER CONSIDERATIONS IN THE LAND-USE PLANNING PROCESS

The following processes provide a framework for defining areas for further consideration for coal leasing.

Threshold Development Levels. In the land use plan, the responsible official can establish development levels within areas where Federal coal may be leased. Thresholds will be used to control impacts which depend on an overall development level rather than on site-specific effects. For example, to protect a local economy, leasing could be held at a level that would assure a gradual, rather than a sudden, growth in mining-induced population; this would give local communities the opportunity to plan for growth. Such leasing thresholds would be established through coordination with local and State officials. Or, if the total population of a deer herd or other wildlife population would be unacceptably reduced by the effects of coal production

above a certain level, leasing schedules could help keep coal production in balance with desired wildlife populations.

Preferred Coal Leasing. Within the areas identified as acceptable for further consideration for coal leasing, the land use plan may identify preferred coal leasing areas. This will be done when available coal demand data suggest that the areas acceptable for further consideration for leasing clearly will yield more coal than will be needed before the land use plan is likely to be reviewed. Preferred areas will be identified by employing available socioeconomic, environmental, and economic data. These preferred area identifications do not commit the regional coal teams to any particular selection of tracts during activity planning.

VI. ACTIVITY PLANNING

During activity planning, tracts will be delineated and selected for sale from the areas designated in the land use plan as acceptable for further consideration for leasing. There are two major parts in this stage of planning. The first is receipt of industry expressions of interest and delineation of potential tracts in each land use planning area. The second phase is tract ranking, selection, and scheduling and will normally be conducted over the entire coal region encompassing many land use planning areas.

Federal/State regional coal teams (RCT) will be established for each of the major multi-State coal regions. The RCT consists of a BLM representative and a State Governor's representative from each State within the region, and a chairperson appointed by the BLM Director. The team: (1) reviews all tract delineation and site-specific analysis work; (2) is responsible for the tract ranking, selection, and scheduling process; and (3) serves as the forum for Federal/State coal management discussions.

Industry Expressions of Interest and Tract Delineation. Although preliminary tract delineation will be done by the authorized surface management agency, industry will be requested to submit expressions of interest in specific coal areas. In addition to industry, any individual, State, or public body may respond when the Secretary issues a call for expressions of leasing interest. A call for expressions of interest will be made only after areas acceptable for further consideration for coal leasing are identified in the BLM land use planning process.

Public inspection and copying of information submitted with the expressions of leasing interest will be permitted in accordance with Departmental regulations. Qualified proprietary data will be safeguarded at the company's request.

Notice of each request for expressions of leasing interest will be published in the Federal Register and at least one newspaper of general circulation in each affected State in the coal region. This notice of request will specify the area or areas involved, information required, the period of time within

which expressions may be submitted, where to write for further information, and where to submit the expressions.

In delineating tracts, the following factors will be among those considered: (1) expressions of interest, (2) technical coal data, (3) maximum economic recovery calculations and logical mining units, (4) surface ownership, (5) preliminary regional leasing targets, and (6) guidance from the regional coal teams.

Regional Tract Ranking, Selection, and Scheduling. In the months before the leasing schedule is established, all available preliminary tracts and tract profile information will be reviewed. Data insufficiencies will be noted and, where time permits, remedied so that each tract will have the coal resource, socioeconomic, and environmental profile needed for ranking. Also, additional unsuitability analysis may be conducted at this stage for lands that were found in the land use planning process to be acceptable pending further study. Any resulting decisions from this unsuitability analysis will be made public. In addition, tract-specific stipulations may be written at this time. The stipulations must be detailed, must comply with SMCRA, and will be subject to change in response to new information contained in the mining plan.

Every 2 or 4 years, the Director of BLM will formally begin the regional tract ranking and selection process. Ranking will be on a coal region-wide basis, and regional comparisons will be based on specific lease tracts. In the ranking process, factors relating to coal economic, ease of reclamation, proximity to existing transportation facilities, class of surface ownership (Federal or non-Federal), and socioeconomic and other environmental concerns will be employed. Ranking will be for general levels of acceptability only. The regional coal teams are expected to emphasize those factors of importance to the region. The ranked tracts will be compared with the regional leasing target, and a set of tracts will be selected on a preliminary basis for a proposed lease sale schedule. Since the potential environmental and social impacts resulting from development of any tracts in the same area are cumulative, the selection of the first tract might preclude selection, or lower the priority of, other highly ranked tracts.

Accordingly, as selections of individual tracts are made, the original rankings of the remaining tracts might be altered so that the final tracts selected will not necessarily correspond directly to the order in which the individual tracts were originally ranked. The number of tracts proposed will depend on the type of bidding system used (intertract or single tract bidding) and the tonnage targeted for lease. The selected tracts will then be placed in a proposed regional lease sale schedule.

Ranking or selection decisions to cluster or disperse leasing patterns within a region may be made based on economic, social, or environmental considerations in the reigon.

The tract ranking and selection process will be conducted in close coordination with the Governors of the States comprising the region.

Consultation with all affected Federal surface management agencies and Indians and other Federal and State agencies with expertise of relevance to the process will also be sought. The RCT will help accomplish this coordination and consultation. Each RCT will consider and suggest policy for setting regional production goals and leasing targets, tract delineation, and site-specific analysis in its region. It will review tract ranking and will establish proposed tract selections and sale schedules. Alternatives will be analyzed in the regional elase sale environmental impact statement and then will be tecommended to the Secretary. If any State representative disagrees with the proposed ranking decisions or selection and scheduling of tracts for lease sale resides with the Secretary upon completion of the Regional Lease Sale EIS.

A notice of intent to rank and select tracts to be included in a proposed regional lease sale schedule will be published in the Federal Register and in selected general distribution newspapers within the coal region at least 15 days before the ranking process begins. The notice will contain a description of the tracts to be ranked and procedures to be followed by interested parties who wish to be involved in the process. Also, one more call for surface owner consent filings may be made for the tracts to be ranked.

Detailed profile information on each of the ranked tracts will be available for inspection in the Bureau of Land Management offices in the coal region. Those parties interested in commenting on the results of the tract ranking and selection process will have the opportunity to do so in the regional lease sale environmental impact statement process before any final decision is made by the Secretary to adopt a lease sale schedule or to hold a lease sale encompassing any of the selected tracts.

Regional Environmental Impact Statement. It is the intent of the Department that the environmental impact statement (EIS) be closely integrated with the coal activity planning process. This will be done by using the decision and analysis documents developed during the delineation, site-specific and cumulative analyses, ranking, selection, and scheduling phass as the basis for the EIS and by incorporating these docuemnts into the EIS either by reference or by direct inclusion. Some special, additional, work will be needed to complete the EIS, but this work is not expected to be substantial. The procedure outlined above is designed to comply with the Council on Environmental Quality regulations for the preparation of EIS's, as well as furthering the Department's goal of providing a more complete description of the actions that have been, and may yet be, taken for Federal coal leasing.

VII. PRE-SALE AND SALE PROCEDURES

From the time a tract is selected for sale at the conclusion of the activity planning stage until a lease can be issued, a series of actions will be required to meet various statutory and administrative requirements. Sales will occur using either a single tract sale system or an intertract sale system. In the individual tract sale method, bidders compete against one another for any given tract. The highest abidder in any sale will be offered

the tract provided the bid meets the Government's minimum acceptable bid, passes the Attorney General's antitrust review, and meets all other requirements of the applicable laws and regulations.

In intertract sales, more tracts will be offered than are intended to be awarded, with only the highest bids (above fair market value) per ton of coal for the desired number of tracts accepted. Intertract lease sales are designed to encourage competition for all tracts in an area when competition for individual tracts may be lacking.

Split Estate Leasing and Surface Owner Consent. Under the original homestead laws, ranchers and farmers were granted both the surface and mineral rights to their land, but later homestead laws provided for retention of some or all of the mineral estate by the Federal Government. The majority of split estates inolving federally-owned mineral rights originated from settlements that took place under these later homestead laws. The retained mineral estate included the right to enter and mine at any time in the future. The private owner of the surface estate did not have the power to prevent mining, although he or she was guaranteed some degree of indemnification for damage.

Section 714 of the SMCRA provides that, in cases where Federal coal is overlain by private land owned and lived on by qualified homeowners or owned by qualified farmers and ranchers, the Secretary may not issue a coal lease for surface mining unless the land owner has granted, in writing, valid consent to conduct such mining operations. Members of this special class of surface owners are defined as persons who:

- Hold legal or equitable title to the land surface; and
- Have their principal place of residence on the land or personally conduct farming or ranching operations on the land or receive a significant portion of their income from farming or ranching the land; and
- Have met these two conditions for at least 3 years prior to granting their consent or refusal to consent.

The amount of Federal coal underlying private surface owned by surface owners as defined in Section 714 is reltively small, but the requirement that landowners' consent be obtained prior to leasing that coal is expected to be significant in determining some local patterns of Federal coal development.

This provision of SMCRA does stipulate that Federal coal underlying private surface is to be leased in accordance with the Mineral Leasing Act of 1920, as amended. The Act requires the Secretary to regulate the leasing process to meet the two purposes of ensuring that leases be sold by competitive bidding and that fair market value be received for the coal. Specifically, the Secretary may monitor surface owner consents to ensure that their form and financial terms do to substantially affect fair market value or the competitive nature of the lease sale. Should these terms threaten the public

interest, the Secretary may decline to proceed with that lease sale or to award the lease if the sale has already been held.

Industry will be responsible for acquiring surface owner consent. Consents must be filed with the BLM up to 30 days prior to the publication of the sale notice. The consents, to be valid, must be transferable. A surface owner consent agreement will be considered transferable only if it provides that (1) the payment for the consent is to be made by the successful bidder or (2) the successful bidder is permitted to reimburse, for the purchase price of consent, the company which first obtained the consent. If no filing of consent is made on a tract prior to the sale announcement, the tract will not be offered for sale.

The surface owner may file a written refusal to consent at the local BLM office any time after completion of the encompassing comprehensive land use plan, thereby disqualifying the coal under the surface owner's land from further leasing consideration. The refusal will be binding during the life of the land use plan or until the ownership of the surface estate changes.

Upon revision of the land use plan, the surface owner will be notified that the prior written submission has expired and will be given the opportunity to submit another statement. Also, whenever industry or other groups notify the BLM of a surface owner who has refused to provide consent to a potential consent purchaser, that owner will be given an opportunity to submit a statement of refusal to consent.

Consents given prior to the enactment of SMCRA were validated under Section 714 regardless of the consent terms. The Department, of course, did not then require that these contain provisions for their transferability. To ensure competitive sales, tracts which are selected for sale and which include areas covered by consents given prior to the enactment of SMCRA will be offered for sale individually only if the consents are determined to be transferable. If pre-existing consents are determined to be non-transferable, the tract will not be offered for sale unless it is included in an intertract sale.

Consultation with Governors, Attorney General, and Indian Tribes. Prior to setting a regional coal lease sale schedule, the Secretary will consult with the Governor of each State in which tracts for lease are located, the U. S. Attorney General, and any Indian Tribes that would be affected by any of the lease proposals being considered. The Secretary

will ask each of the parties to comment in a specified period of time before issuing the final sale schedule. A specific procedure for consultation with a State Governor when a lease proposal is for surface mining within the boundaries of any National Forest within that State is required by the FCLAA and is incorporated in the coal management regulations.

Fair Market Value. The Mineral Leasing Act of 1920, as amended by the FCLAA, specifically mandates that, "No bid shall be accepted which is less than the fair market value, as determined by the Secretary, of the coal subject to the lease." The basic methods for evaluating fair market value are comparable sales analysis and discounted cash flow analysis. The discounted cash flow analysis involves calculating annual costs and income resulting from the development of a property under realistic conditions. Comparable sales analysis is an appraisal approach in which the value of coal is based on prices paid in actual market transactions.

Before the Department makes any determination, industry and the public will be given the opportunity to comment on fair market value considerations for any tract being offered for sale (especially on the values that should go into the fair market value determination) as well as on the related decision of maximum economic recovery.

The DOI must also determine the bidding method for Federal coal lease sales. The Department, in cooperation with DOE, will experiment with alternate bidding methods, adopting those which are most successful. Among those suggested are:

- Direct or deferred bonus bidding. Cash payment is offered for the proposed lease. (The Federal Coal Leasing Amendments Act of 1976 requires half of all sales to be by deferred bonus bid.)

- Variable royalty bidding. Bids are placed in the form of royalty rates based on a percentage of the value of the coal recovered (usually a small cash down payment is also required).

- Sliding scale royalty bidding. Cash payment is offered for the proposed lease, but the amount of the royalty paid is varied in proportion to the value of the coal produced.

In addition, DOE intends to study the possibility of using a profit sharing method. In this case, the government essentially becomes a partner in the coal enterprise and receives a bid which offers a percentage of profits.

Maximum Economic Recovery. The Federal coal management regulations require maximum economic recovery (MER) of Federal coal on all new Federal coal leases. MER will be calculated for leases on the basis of marginal cost equaling marginal revenue--just as is done by industry to determine the most profitable plan for mining the coal. The preliminary MER will be published in the lease sale notice to assist coal producers in preparing their bids. Final MER will be determined by the mining supervisor after lease exploration.

be published in the lease sale notice to assist coal producers in preparing their bids. Final MER will be determined by the mining supervisor after lease exploration.

VIII. SPECIAL LEASING OPPORTUNITIES

In response to the FCLAA and the Small Business Act of 1953, as amended, the Department will reserve and offer a reasonable number of coal lease tracts as special leasing opportunities. These opportunities will be provided through special lease sales where public bodies will bid only against public bodies and small business concerns only against other small businesses.

Small Business Set-Aside. In the interest of assisting and protecting small business enterprises and priviling a wider opportunity for competition in the coal industry, the DOI and the Small Business Administration have agreed through a Memorandum of Understanding (MOU) to set-aside coal leasing tracts for sale to small businesses only. During tract delineation, the SBA together with the DOI will review lands being considered as potential lease tracts and will indicate possible locations of Federal coal lease tracts to be set aside. Every effort will then be made to hold a set-aside sale where SBA officials, in consultation with DOI, expect good participation by small businesses. It is the official policy of the SBA and the DOI to encourage and promote participation by minority small business and economically disadvantaged concerns in the small business set-aside sales. The set-aside tracts will be reserved and first offered for lease through competitive bidding only to entities defined by SBA as small businesses.

Public Body Set-Aside. After the ranking and selection process, the Secretary may designate and schedule one or more coal lease tracts for special opportunity lease sales for public bodies if a public body, through submission of an expression of leasing interest, requests that a special opportunity lease sale be held. With the submission of this request, the public body must provide evidence of its qualifications to participate in a special opportunity sale. Public bodies are non-profit, consumer-owned utilities, such as rural electric cooperatives, municipally owned utilities, and Federal, State and local agencies.

IX. LEASING ON APPLICATION

The bulk of the competitive coal leasing to be done by the Department will be through the activity planning process outlined in section V. However, there are two situations where a limited amount of competitive coal leasing will be done in response to applications. The first involves applications within the designated western production regions where activity planning will occur. In this situation (emergency leasing), leasing in response to applications. The first involves applications within the designated western production regions where activity planning will occur. In this situation (emergency leasing), leasing in response to applications will be considered in cases where:

A. Federal coal is needed within 3 years to maintain an existing mining operation at the average annual level of production or where a new contracted level of production is required or;

B. If the coal deposit is not leased it will be bypassed for the foreseeable future and, if leased, some portion of the tract applied for will be utilized within 3 years, as substantiated by the proposed production levels stated in a mining sequence plan; and;

C. The need for the coal deposit resulted from circumstances that were beyond the control of the applicant or for which he could not have reasonably foreseen and planned.

All decisions for leasing in response to applications must be consistent with the appropriate land use plan or analysis and the unsuitability criteria. Only 8 years of reserves will be offered. The emergency leasing system will not be substituted for the procedures required in the full decision-making cycle and should become less significant with the passage of time. Applications which are not compatible with existing land use plans for the area will be rejected.

The second situation where applications will be accepted is for coal areas outside of the western production regions and within the mid-western and eastern production regions where limited Federal land ownership makes activity planning impractical. The areas applied for will be subject to land use planning and environmental analyses. If compatible with such analyses, competitive lease sales will be held in response to the applications.

X. ADMINISTRATION OF EXISTING LEASES AND PREFERENCE RIGHT LEASE APPLICATIONS (PRLA's)

A significant element of the Department's Federal coal management program is the administration of existing coal leases and preference right lease applications. The amount of coal involved is considerable. As of September 30, 1979, there were 546 Federal coal leases estimated to contain 16.2 billion tons of recoverable coal and 176 preference right lease applications which contain an estimated 5.7 billion tons of recoverable coal.

Existing Leases. The new planning requirements and unsuitability criteria will be applied to all non-producing leases. However, the DOI will await the submission of a mining plan by the lessee before deciding the desirability of lease development. (This does not preclude evaluation as part of the normal planning process if the lease is situated within an area undergoing planning.) The mine plan will be reviewed in light of unsuitability criteria to determine which, if any, apply. If any criterion applies, the specific criterion and any exception to it which the conditions permit to be applied will be identified. If a criterion does not apply and the conditions do not permit an exception, a further decision will be made on whether the land is exempt from the criterion because of the source of the authority for the provisions of the

source of the authority for the provisions of the criterion. All unsuitability studies will include public hearings before any final assessments are adopted as part of a land use plan or environmental analysis on a mine plan.

The DOI, in 1976, established diligence regulations for all leases issued prior to the FCLAA. These rules require the production of 2 1/2 percent of the lease reserves by June 1, 1986 (diligent development), and 1 percent of the lease reserves every year after achieving diligent development (continued operation). In order to assure that these obligations are understood by all holders of these 528 leases, GS has notified them about the tonnages of coal necessary to meet these obligations, and the BLM will request that each lessee expressly agree to the applicability of these requirements by signing a revision to its lease that incorporates these requirements. These obligations will be enforced by considering cancellation of non-producing leases in 1986. These obligations superseded any and all production obligations in the existing leases. If a significant number of lessees resist this principle, however, the Secretary may consider action to enforce the existing lease terms before 1986 against those lessees who do not sign the lease revision.

Leases are subject to readjustment at the end of the current 20th lease year and each 10 year period thereafter. Lease royalties will be readjusted to conform to FCLAA and the regulation, i.e., not less than 12 1/2 percent for coal mined by surface mining methods and 8 percent for underground mined coal. Where the lessee can demonstrate that underground mining is uneconomical at 8 percent, the lease royalty may be reduced to not less than 5 percent. In addition, at the time of readjustment, leases will be made expressly subject to the diligence requirements and any special stipulations that are determined to be necessary.

When considering lease assignments, the following review processes will be adhered to:

A. All lessees who received their leases through assignments in the last 5 years will be notified and required to disclose, within 90 days after notification, the financial terms of the assignment.

B. New assignments will not be approved unless the financial terms of the assignment are disclosed.

C. Information received on assignments will be analyzed to determine whether the current requirement of a 50 percent limitation on overriding royalties should be changed.

D. All assignments will be sent to the Department of Justice for antitrust review.

E. An assignment will not be approved except when it meets the same competitive bid standards as the Department has for other leases.

F. Assignments which have been filed and are for non-producing leases will receive the highest priority for processing.

G. The DOI will seek regulatory authority, through DOE, to require all assignees to submit a definite plan for meeting diligence as a condition for approval of the assignment.

Preference Right Lease Applications (PRLA's). Until the early 1970's, the Federal Government issued prospecting permits to interested parties to explore for coal in areas where workable deposits were not known to exist. By demonstrating that the permit area contained commercially valuable coal, a prospecting permit holder could apply for and obtain a lease to mine the deposit. Such lease applications where called preference right applications (PRLA's), and leases were issued without competition. Under the FCLAA, such noncompetitive coal leases are no longer permitted, subject to valid existing rights.

Under the new Federal coal management program, a company with a pending application for a preference right lease shall be entitled to a noncompetitive coal lease if the applicant can demonstrate that commercial quantities of coal on the prospecting permit lands were discovered within the terms of the permit, other requirements having been met. As a matter of policy, the Department shall complete the processing of all preference right lease applications by December 1, 1984.

PRLA processing steps involve:

A. Initial showing. The applicant must submit to BLM the quantity and quality of the reserves discovered within the boundaries of the prospecting permit.

B. Preference right lease applications will be processed in the cycle of ongoing comprehensive land use plans. If the applicant can show that processing the application in the normal cycle of land use planning will cause substantial hardship, the DOI will, if possible, advance the time on processing the application.

C. After the applicant has completed the initial showing, the BLM will conduct an environmental analysis of the PRLA which will involve either an environmental assessment or an environment impact statement.

D. Upon completion of the environmental analysis, which includes application of unsuitability criteria, the BLM will request a final showing by the applicant consistent with the regulations. Upon approval, a lease will be issued.

XI. SPECIAL START UP CONSIDERATIONS: NEED FOR LEASING; AND PROGRAM IMPLEMENTATION

It will not be possible to carry out all aspects of the Federal coal management program until 1984 in most cases, and 1986 in others, due to

budget constraints and personnel ceilings. The Secretary has determined that lease sales must be held beginning in January 1981 to assure development of sufficient coal to meet the President's domesic energy production goals. Competitive leasing during the transitional period will not include all the planning elements of the new Federal coal management program.

The principal differences between the mature program and start-up procedures are:

A. During the transition period, existing land use plans must be supplemented with the application of the unsuitability criteria and surface owner consultation; a cut-off date, after which activity planning will not be initiated on land use plans that are in less than full compliance with BLM land use planning regulations under FLPMA was established, and a reasonable basis on which to proceed to tract delineation, evaluation, ranking, and scheduling for sale must be provided.

B. The notice of intent to rank tracts will be issued immediately prior to initiation of ranking.

C. The first regional lease sale enviornmental impact statements will address a 2 year rather than a 4 year lease sale schedule.

The earliest that coal lease sales must take place in order to meet regional production needs is early 1981. Regions presently designated for early leasing are the Powder River, Green River/Hams Fork, Uinta-Southwestern Utah, and Southern Apalachian Coal Regions.

As described in part III, the Federal coal management program uses regional leasing targets derived from coal production and mine projections to ensure that future coal needs will be met. Based on the projections then available, the Secretary announced tentative targets in three regions and directed that preparations for leasing begin in a fourth. The lease sale time frames and leasing targets for each region are indicated below.

Green River/Hams Fork. A January, 1981 lease sale date was established with a tentative leasing target of 531 million tons. The leasing target will be set to achieve 1985 through 1987 production levels, with no mid-1986 excess capacity.

Uinta-Southwestern Utah. A July, 1981 lease sale date was established with a tentative leasing target being that of the medium level DOE production (109 million tons). The final leasing target will be set to achieve 1985 through 1990 production levels with no excess capacity. Public comment on the tentative leasing target will be requested prior to final target selection.

Powder River. An early 1982 lease sale date was established with a tentative leasing target of 621 million tons, plus an additional 25 percent to allow greater flexibility and to promote competition. The final leasing target will

be set to achieve 1985 through 1987 production levels, with high mid-1986 excess capacity assumed. Public comment on the tentative leasing target will be requested prior to the final target selection.

Southern Appalachia. The Secretary directed preparation and environmental analysis for a July, 1981 lease sale. No leasing target was established.

NOTE: All the leasing targets listed above are under study and are based on ongoing efforts of the RCT's and their recommendations to the Secretary.

For more detailed information about the Federal Coal Management Program, copies of the Final Environmental Statement on the program are available from:

Office of Coal Management
Bureau of Land Management
U.S. Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

For information about specific Federal coal management activity in your State, write to the State Director, Bureau of Land Management:

701 "C" Street, Box 13
Anchorage, Alaska 99513

Colorado State Bank Building
Room 700, 1600 Broadway
Denver, Colorado

222 N. 32nd Street
P.O. Box 30157
Billings, Montana 59107

U.S. Post Office Federal Building
South Federal Place
Box 1449
Santa Fe, New Mexico 87501

University Club Building
136 East South Temple
Salt Lake City, Utah 84111

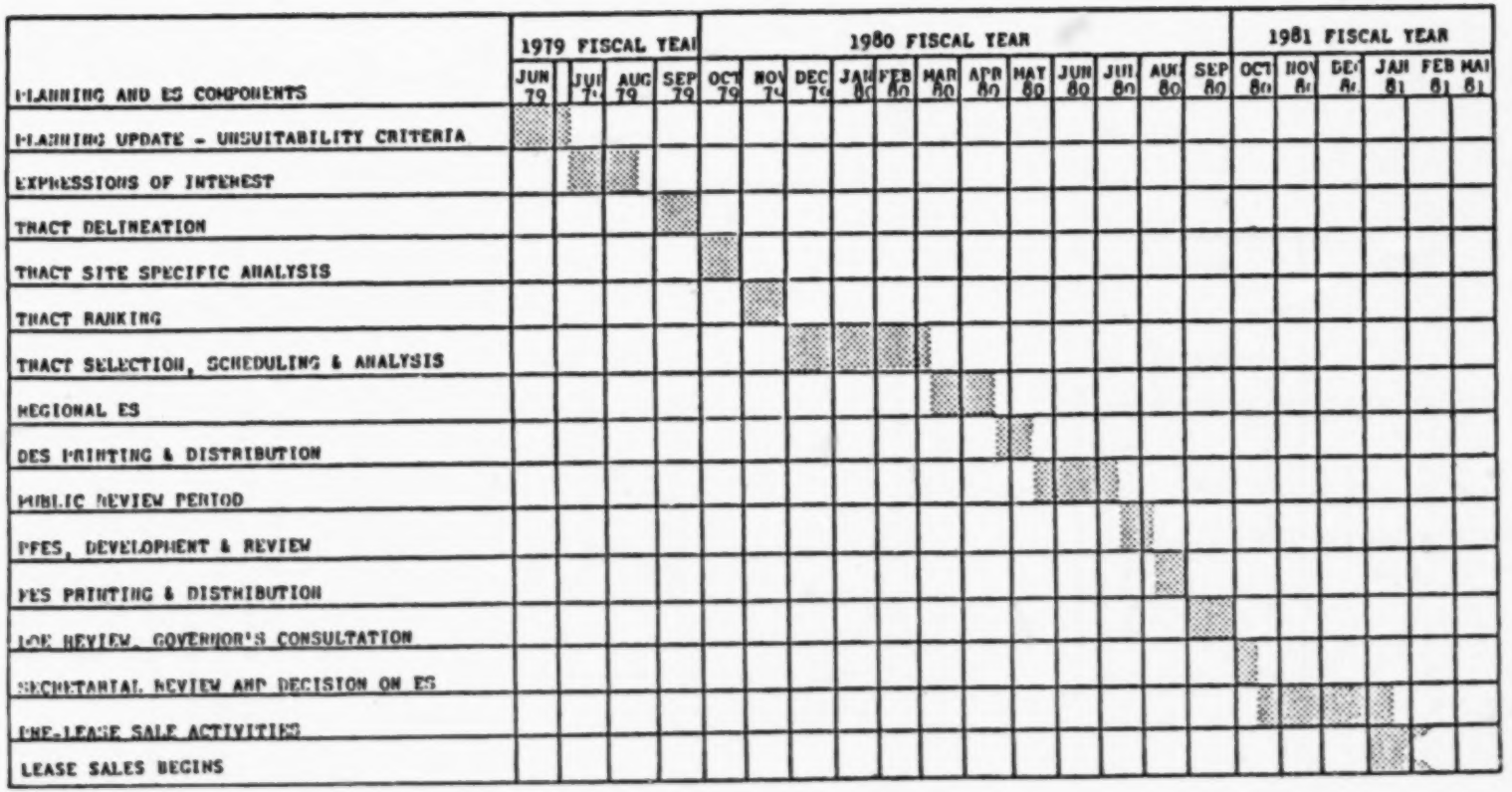
2515 Warren Avenue
P.O. Box 1828
Cheyenne, Wyoming 82001

Denver Federal Center
Building 50
Denver, Colorado 80225

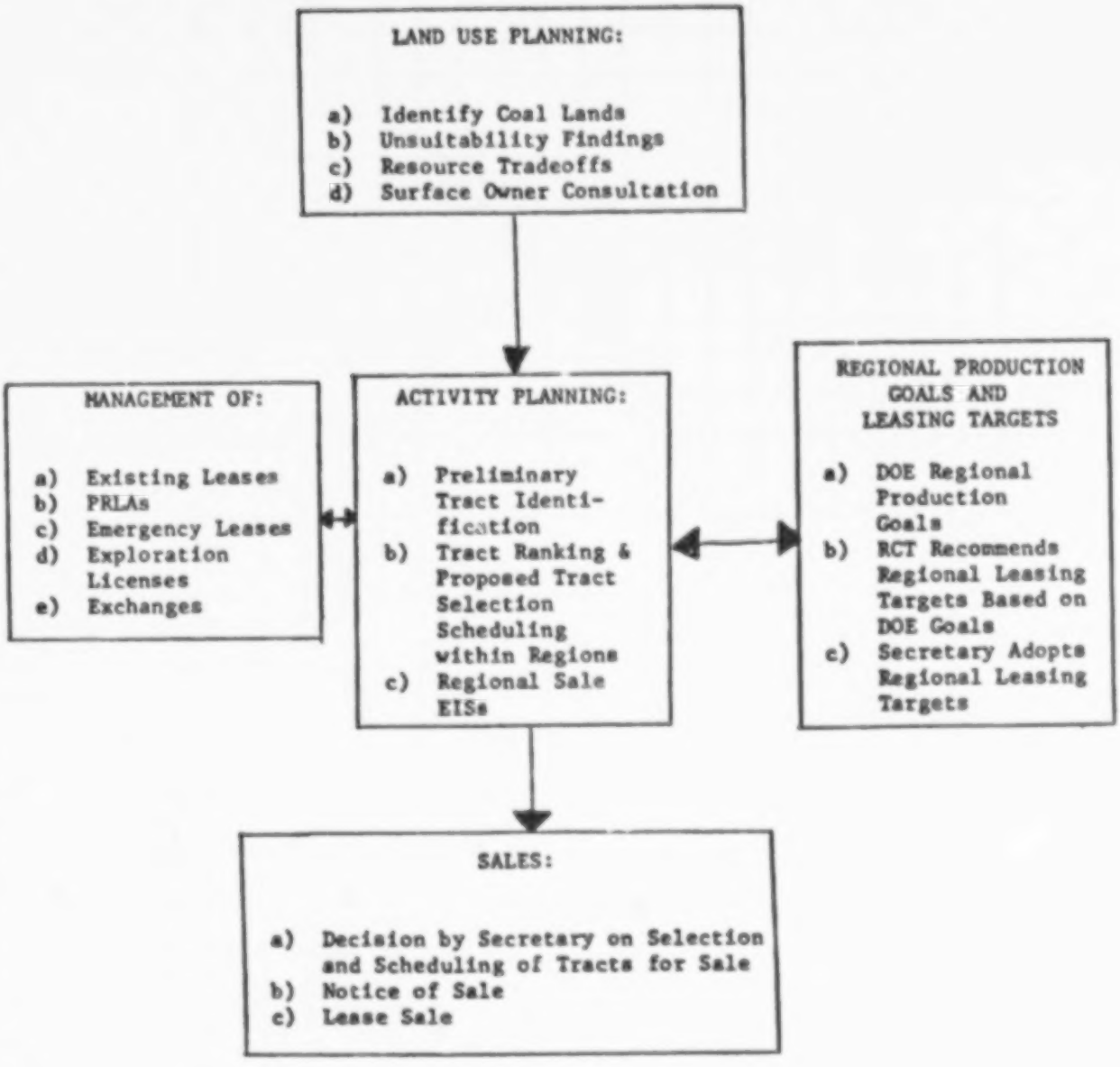
or, in the eastern United States,

350 South Pickett Street
Alexandria, Virginia 22304

SAMPLE TIME FRAME - FISCAL YEAR - GREEN RIVER - HAMS FORK REGIONAL LEASING SCHEDULE *



* These dates, except for the October 15, 1980 and January 15, 1981, dates, are best estimates and may be subject to change.


LAND USE PLANNING:
a) Identify Coal Lands
b) Unsuitability Findings
c) Resource Tradeoffs
d) Surface Owner Consultation
MANAGEMENT OF:
a) Existing Leases
b) PRLAs
c) Emergency Leases
d) Exploration Licenses
e) Exchanges
ACTIVITY PLANNING:
a) Preliminary Tract Identification
b) Tract Ranking & Proposed Tract Selection Scheduling within Regions
c) Regional Sale EISs
REGIONAL PRODUCTION GOALS AND LEASING TARGETS
a) DOE Regional Production Goals
b) RCT Recommends Regional Leasing Targets Based on DOE Goals
c) Secretary Adopts Regional Leasing Targets
SALES:
a) Decision by Secretary on Selection and Scheduling of Tracts for Sale
b) Notice of Sale
c) Lease Sale

Land Use Planning - Activity Planning - Regional EIS Schedule - Interior Agency Involvement

Dates		Description of Action	Agency Involvement
Begin	Completion		
Nov. 1978	July 6, 1979	Planning Update - Unsuitability Criteria	BLM; FWS
July 10, 1979	Aug. 24, 1979	Expressions of Interest	BLM
Sept. 1, 1979	Sept. 30, 1979	Tract Delineation	GS; BLM
Oct. 1, 1979	Oct. 30, 1979	Tract Site-Specific Analysis	BLM; GS; OSM
Nov. 1, 1979	Nov. 30, 1979	Track Ranking	BLM; GS; FWS; OSM
Dec. 1, 1979	Mar. 7, 1980	Tract Selection, Scheduling & Analysis	BLM; GS; FWS; OSM
Mar. 8, 1980	Apr. 15, 1980	Regional EIS	BLM; GS; FWS; OSM; HC & RS; BR; BIA
Apr. 16, 1980	May 7, 1980	DEIS Printing and Distribution	BLM
May 8, 1980	July 7, 1980	Public Review Period	BLM; GS; FWS; OSM; HC & RS; BR; BIA
July 8, 1980	Aug. 7, 1980	PFEIS, Development & Review	BLM; GS; FWS; OSM; HC & RS; BR; BIA; Dept.
Aug. 8, 1980	Aug. 31, 1980	FEIS Printing and Distribution	BLM
Sept. 1, 1980	Sept. 30, 1980	DOE Review, Governor's Consultation	BLM
Oct. 1, 1980	Oct. 15, 1980	Secretarial Review Decision on FEIS	Secretary's Office
Oct. 16, 1980	Jan. 15, 1981	Pre-Lease Sale Activities	BLM, GS
Jan. 15, 1981		Lease Sale Begin	BLM

These dates, except for the Oct. 15, 1980 and Jan. 15, 1981 dates, are best estimates, and may be subject to change as the EIS Preparation Plan is developed. They apply only to the Green River-Hams Fork Region.

GLOSSARY

Activity Planning--means the process of delineating, ranking, selecting, and scheduling tracts of Federal land that were found acceptable for further consideration for competitive leasing during land use planning.

Bureau of Land Management (BLM)--is the Nation's largest land manager. It administers lands in Federal ownership under multiple-use principles in the public interest. BLM is responsible for issuing coal leases and conducting land use planning in the Federal coal management program.

CRO/CDP Maps (Coal resource occurrence/coal development potential maps)--USGS maps covering areas of significant coal potential at a scale of 1:24,000, and providing extensive detail on coal thickness, quality, and development potential.

Energy Minerals Activity Recommendation System (EMARS)--The 1975 coal management program was made up of three phases: (1) nomination and programming, (2) scheduling, and (3) leasing.

Federal Coal Leasing Amendments Act 1976 (FCLAA)--Law specifying rules to guide the development of coal.

Federal Lands--means lands owned by the United States, without reference to how the lands were acquired or which agency administers the lands, including mineral estate or coal estate underlying private surface, excluding lands held by the United States in trust for Indians, Aleuts, or Eskimos, and lands within the boundaries of Federal Indian Reservations.

FLPMA (Federal Lands Policy and Management Act (1978)--Law specifying how the BLM and the DOI are to assure that all Federal resource development decisions in public lands are made in cooperation with State and local government.

KRCRA (Known Recoverable Coal Resource Areas)--are minimum USGS designations of land areas that contain coal meeting minimum standards of quantity, quality, and extent. These standards generally reflect accepted mining practices in the districts the KRCRA's are part of.

Land Management Planning--means those land use planning and decisionmaking processes conducted by the BLM pursuant to the Federal Land Policy and Management Act and the Federal Coal Leasing Amendments Act, and by the Forest Service pursuant to the National Forest Management Act.

Lease--means a Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws which authorized the exploration for, or extraction of, coal only under an approved exploration or mining plan.

Lease stipulations--means a Federal coal lease or license to mine issued under the coal leasing provisions of the mineral leasing laws which authorizes the exploration for, or extraction of, coal only under an approved exploration or mining plan.

Lease stipulations--means additional requirements which are added to the printed provisions contained in the standard Federal coal lease form.

NRDC vs Hughes--Lawsuit filed against the 1975 EMARS program claiming that the environmental impacts described in the EIS were inadequate.

Office of Surface Mining (OSM)--is responsible for establishing minimum national standards for regulating surface effects of coal mining, and for assisting States implementing regulatory programs. OSM also promotes reclamation of previously mined lands.

Preference Right Lease Applications (PRLA's)--until the early 1970's the Federal Government issued prospecting permits to interested parties to explore coal in areas where economically valuable deposits were not known to exist. By demonstrating that the permit area contained commercially valuable coal, a prospecting permit holder could apply for, and obtain, a lease to mine the deposit. Such lease applications were called preference right lease applications (PRLA's) and leases were issued without competition. Under the Federal Coal Leasing Amendments Act of 1976, noncompetitive coal leases are no longer permitted, subject to valid existing rights.

Qualified Surface Owner--holds legal or equitable title to the land surface; and has their principal place of residence on the land or personally conducts farming or ranching operations on the land or receives a significant portion of their income from farming or ranching the land; and has met these two conditions for at least 3 years prior to granting their consent.

Regional Coal Team--means a specific coal production region's Federal/State team which pursuant to 43 CFR 3400.4(b) shall consider and suggest policy for regional leasing target setting, tract delineation, and site-specific analysis in the coal produiction region; guides and reviews tract ranking; and conducts the selection and sale scheduling process in order to recommend regional lease sale alternatives to be analyzed in the Regional Lease Sale Environmental Impact Statement and to be recommended to the Secretary.

Small Business--any firm bidding to lease Government land for purposes of coal mining is classified as small if:

1. It is independently owned and operated;

2. It is not dominant in its field of operation;

3. Together with its affiliates, its number of employees does not exceed 250 persons;

4. It maintains management and control of the actual mining operations at the tract; and

5. Any transfer of the lease from the holder of the original set-aside must be another small business within the meaning of the paragraph.

Surface Mining Control and Reclamation Act 1977--Law specifying rules to guide mining and reclamation.

Tract--means a defined area of land which will logically be proposed as a single lease offering. At the preliminary tract stage, the exact boundaries of tracts would still be subject to adjustment based on subsequent analysis.

APPENDIX C

UNSUITABILITY CRITERIA

APPENDIX C

UNSUITABILITY CRITERIA

UNSUITABILITY ANALYSIS FOR PRLA C-0126997

Regulations for coal management given in 43 CFR 3461 require BLM to apply twenty unsuitability criteria to lands considered for lease for surface coal mining. If any of the criteria were found to apply, stipulations to protect the environmental values identified would be developed. These criteria were applied to this PRLA and while none of them were found to absolutely prevent leasing, four of them would require that mitigating measures be applied before the tract could be found suitable for leasing.

There is a prehistoric archaeological site which under Criterion 7, Historic Lands and Sites, which may require protection. Further study may prove that other sites must also be protected.

The tract has golden eagle nests within and adjacent to its boundaries, which under Criterion 11 must be protected. Buffer zones around the nest areas have been established.

There may be some minor flood plains on the tract. Consultation with USGS is underway to assess what, if any, mitigating measures would need to be applied to prevent violation of Criterion 16, Flood Plains.

A detailed description of the application of each of the twenty unsuitability criteria follows:

Criterion 1: Federal Land Systems

None of the Federal land systems were found on the application area. Therefore, the area was not considered to be unsuitable.

Criterion 2: Rights-of-Way and Easements

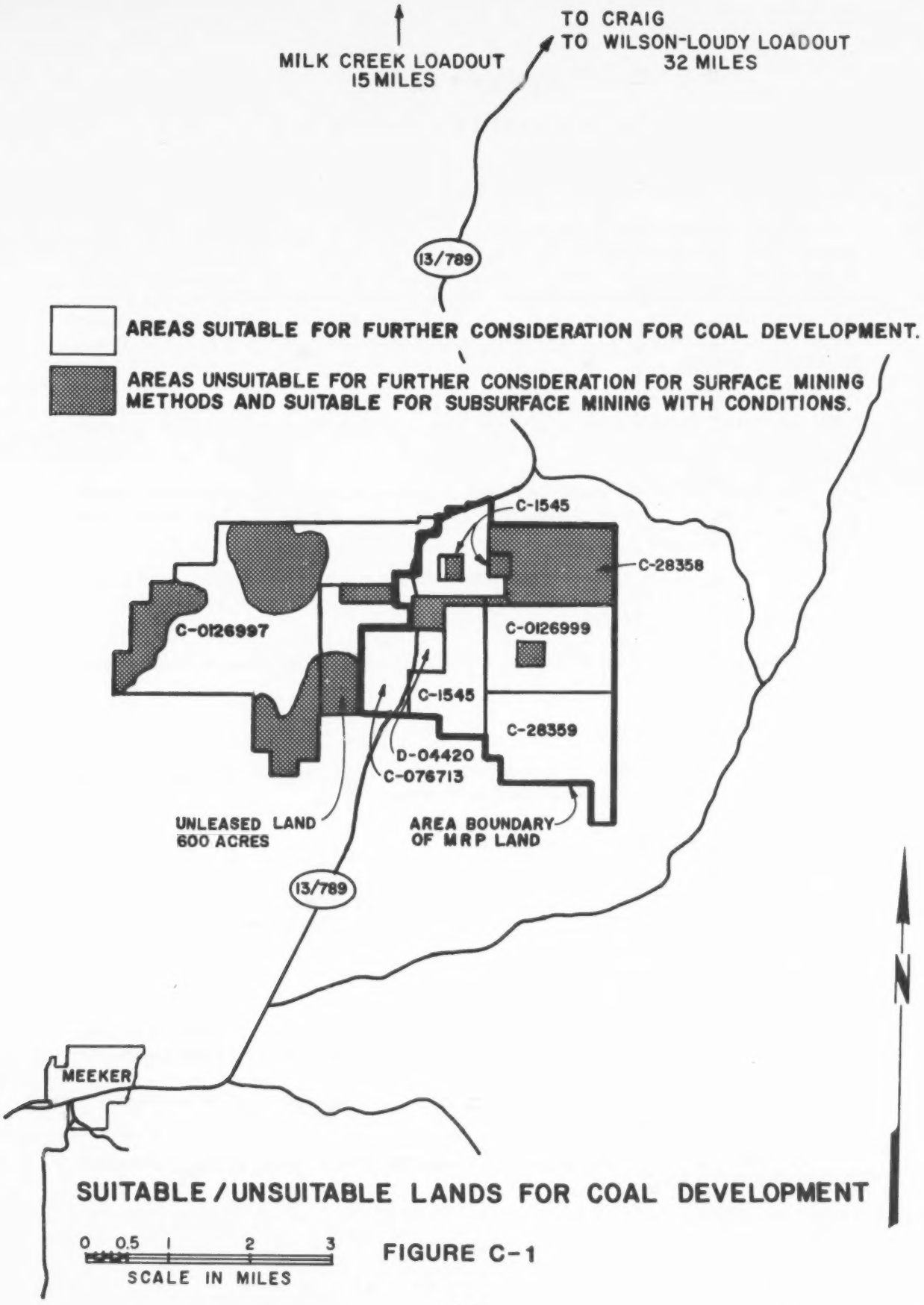
Field examination and consultation with District and Area staff indicates that no rights-of-way, easements, surface leases, or agricultural crop production (on federally owned surface) occur on the area. The criterion is, thus, not applicable.

Criterion 3: Buffer Zones

Field examination and contacts with District and Area staff members indicate that none of the application area would be considered unsuitable under this criterion.

Criterion 4: Wilderness Study Area

No lands have been designated as Wilderness Study Areas within or adjacent to the application area.



SUITABLE / UNSUITABLE LANDS FOR COAL DEVELOPMENT

FIGURE C-1

Criterion 5: Scenic Areas

No Class I Scenic Areas have been identified within or adjacent to the application area.

Criterion 6: Lands Used for Scientific Studies

None of the application area is being used for scientific studies or specified in the criterion.

Criterion 7: Historic Lands and Sites

Three archaeological surveys at the Class III level have been conducted in PRLA C-0126997. A total of 160 acres have been inventoried which constitutes less than 1 percent of the entire PRLA (3,566.38 acres). One site was located in the course of these surveys. 5RB1224 is an open lithic scatter overlooking (northwest of) Curtis Creek. No determination as to the eligibility of this site to the National Register has been made pending testing. Based on this, it is recommended that this area be considered suitable for coal leasing with the following stipulations:

1. If surface disturbance is proposed for site 5RB1224 a mitigation plan will be required per standard stipulation 1.4.

2. Subsidence monitoring data (as required by OSM) will be provided to the BLM Area Manager. If subsidence is determined to be affecting cultural resources, appropriate measures will be taken to mitigate its effect.

Criterion 8: Natural Areas

No lands have been designated or proposed for designation as Natural Areas or as National Natural Landmarks.

Criterion 9: Federally Listed Endangered Species

There are no areas of critical habitat identified for federally listed threatened and endangered (T/E) animal species in the immediate PRLA area. This determination was made in consultation with BLM and Fish and Wildlife Service.

No threatened and endangered or sensitive plant species are known to occur on the site. It is anticipated that the area will be determined suitable; however, field surveys have not been conducted. A field survey will be done in June 1981 and final determination made at that time.

Criterion 10: State Listed Endangered Species

The State threatened and endangered species list conforms to the Federal listing. The previous narrative pertaining to federally listed endangered species (Criterion 9) is equivalent to this criterion.

After consultation with the Colorado Division of Wildlife, it was determined that no State-listed animal species, or their habitat, would be adversely affected by lease development.

Since no field surveys have been done, the narrative for Criterion 9 will apply to State-listed plant species also.

Criterion 11: Bald and Golden Eagle Nests

Intensive helicopter survey for raptor nests was accomplished by BLM biologists during the summer of 1980. Two active golden eagle nests were found within the PRLA boundaries. Seventeen additional nests were found beyond the tract's perimeter, but within a distance where certain mine-related activity could disrupt or adversely influence successful function of these sites.

BLM and FWS biologists delineated buffer zones around each active nest site which would afford protection from auditory and visual disturbance. The area within these buffer zones is considered unsuitable in order to protect individual nest productivity and ensure continued use of these traditional sites.

Exclusion of mine-related activities within the buffer zones was not considered necessary as underground mining techniques would be employed for application development. The following stipulations would be applied within the Golden Eagle Buffer Zones:

1. Facility Restrictions: Portals, tipples, haul roads, or other major, permanent ancillary features which the BLM determines would jeopardize the continued use of established raptor nests or prevent successful reproductive efforts would not be permitted.

2. Activity Restrictions: Temporal activity restrictions on mine activities would be imposed on a site-specific basis by BLM depending on (a) whether activity timeframes and raptor occupation of nest sites are concurrent, and (b) the nature of the proposed activity, such as location relative to occupied nest sites, frequency of use, conspicuousness, and persistence. The seasonal restriction would coincide with the raptor nesting season, March 1 (nest initiation) to July 31 or until chicks have fledged.

Legals for golden eagle buffer zones:

T. 2 N., R. 93 W., 6th P.M.

Section 19: W½SW¼SW¼NE¼
S½NE¼NW¼
NW¼NW¼NW¼
S½NW¼NW¼
S½NW¼
N½SW¼
N½SW¼SW¼
SW¼SW¼SW¼
NW¼SE¼SW¼SW¼
NW¼NE¼SE¼SW¼
NW¼SE¼SW¼
W½NW¼NW¼SE¼

T. 2 N., R. 93 W., 6th P.M.--Continued

Section 30: SE¼SE¼NE¼SW¼
E½SE¼SW¼
SW¼SW¼SE¼SW¼
E½SW¼SE¼SW¼

Section 31: E½NW¼
SE¼NE¼NW¼NW¼
E½SE¼NW¼NW¼
SW¼SE¼NW¼NW¼
E½SW¼NW¼
SW¼NW¼SW¼NW¼
SW¼SW¼NW¼
N½SW¼
SW¼SW¼

T. 2 N., R. 94 W., 6th P.M.

Section 23: S½SE¼

Section 24: NE¼
NE¼NE¼NW¼
N½SE¼NE¼NW¼
SE¼SE¼NE¼NW¼
E½NE¼SE¼NW¼
E½SE¼SE¼NW¼
W½SW¼SW¼
E½SE¼
E½NW¼SE¼
N½NW¼NW¼SE¼
SE¼NW¼NW¼SE¼
E½SW¼NW¼SE¼
NE¼SW¼SE¼
E½SE¼SW¼SE¼

Section 25: N½N½NE¼NE¼

Section 26: NW¼NE¼NE¼
N½NW¼NE¼
SW¼NW¼NE¼
W½SW¼NE¼
E½NW¼
N½N½SW¼
SW¼NE¼SW¼
S½NW¼SW¼
N½SW¼SW¼
SW¼SW¼SW¼

Section 36: S½NE¼NE¼
SE¼NE¼
NE¼SE¼

Criterion 12: Bald and Golden Eagle Roost and Concentration Areas

A major bald eagle winter roost and concentration area exists on the White river, 5 miles south of the PRLA. After consultation with the Fish and Wildlife Service, it was determined that the bald eagle winter concentration area is removed from the tract to the extent that coal development would not prove detrimental to the wintering eagle population or their habitat.

Criterion 13: Falcon Cliff Nesting Sites

No suitable cliffs available for falcon nesting occur on the PRLA.

Criterion 14: Migratory Birds

No high priority areas were found.

Criterion 15: State Resident Fish and Wildlife

After consultation with the Colorado Division of Wildlife, it was determined that no resident wildlife would incur significant long-term adverse impact. The area is therefore considered suitable.

Criterion 16: Flood Plains

No flood plains have been identified as unsuitable.

Criterion 17: Municipal Watersheds

No municipal watersheds have been identified within the potential coal lease area.

Criterion 18: National Resource Waters

To date, no water courses in the application area have been officially designated as National Resource Waters in completed water quality management plans. Because the areas under review have not officially been designated, they were considered suitable.

Criterion 19: Alluvial Valley Floors

Several alluvial valley floors (AVF) occur within the PRLA boundary; however, none are considered to be unsuitable since no farming has occurred. In addition, the AVF's which are not cropped are undeveloped rangeland and are considered suitable. On development of a mine plan, sufficient data should be available in order to determine if mining of areas adjacent to the AVF's would impact water systems that supply the AVF's. Mitigation could then be designated; therefore, the areas adjacent to the AVF are considered suitable.

Criterion 20: State-Proposed Criteria

To date the State has not furnished any unsuitability criteria.

UNSUITABILITY ANALYSIS FOR PRLA C-0126999

Regulations for coal management given in 43 CFR 3461 require the BLM to apply twenty unsuitability criteria to lands considered for lease for surface coal mining. If any of the criteria were found to apply, stipulations to protect the environmental values identified would be developed. These criteria were applied to this PRLA and while none of them were found to absolutely prevent leasing, one of them would require that mitigating measures be applied before the tract could be found suitable for leasing.

There is a prehistoric archaeological site which under Criterion 7, Historic Lands and Sites, requires protection.

There is one minor flood plain on the tract.

A detailed description of the application of each of the twenty unsuitability criteria follows:

Criterion 1: Federal Land Systems

None of the Federal land systems were found on the application area. Therefore, the area was not considered to be unsuitable.

Criterion 2: Rights-of-Way and Easements

Field examination and consultation with District and Area staff indicates that no rights-of-way, easements, or agricultural crop production (on federally owned surface) occur on the area. The criterion is, thus, not applicable.

Criterion 3: Buffer Zones

Field examination and contacts with District and Area staff members indicate that none of the application area would be considered unsuitable under this criterion.

Criterion 4: Wilderness Study Area

No lands have been designated as Wilderness Study Areas within or adjacent to the application area.

Criterion 5: Scenic Areas

No Class I Scenic Areas have been identified within or adjacent to the application area.

Criterion 6: Lands Used for Scientific Studies

None of the application area is being used for scientific studies or specified in the criterion.

Criterion 7: Historic Lands and Sites

PRLA C-0126999 has received a complete Class III (100%) inventory. Two sites were located, 5RB1218 and 5RB1219.

5RB1218, the Gaddis Homestead site, has been evaluated by the BLM Colorado State Historian and a request for determination of eligibility of the National Register of Historic Places (NRHP) was forwarded to the Colorado State Historic PreservationOfficer (SHPO). The SHPO and the BLM concur that 5RB1218 is not eligible to the NRHP (9-18-80).

5RB1219 is a prehistoric open campsite at which Fremont pottery and a middle Archaie (2000-1500 B.C.) style projectile point were found. The site is extensive and most of the cultural material was found in disturbed areas, which indicates high potential for buried material. A road bisects the site which is intended for use in the mining operation. Because of the nature of the cultural material and the probability that this is a buried site and therefore likely to yield valuable scientific information about the intriguing and little understood Fremont and Archaic lifeways, it is considered eligible to the National Register of Historic Places.

Stipulations:

1. Because of the significance of 5RB1219, a buffer zone which includes an area of 10 acres centered around 5RB1219 has been designated to insulate this valuable cultural resource. The site itself and the buffer zone is considered unsuitable for surface occupancy or disturbance.

2. Where underground mining is to take place, monitoring by a qualified archaeologist will be done to determine degree of subsidence at 6-month intervals.

Criterion 8: Natural Areas

No lands have been designated or proposed for designation as Natural Areas or as National Natural Landmarks within the PRLA.

Criterion 9: Federally Listed Endangered Species

There are no areas of critical habitat identified for federally listed threatened and endangered (T/E) animal species in the immediate PRLA area. A no jeopardy opinion was rendered by the U.S Fish and Wildlife Service on all T/E animals potentially affected by leasing. This determination was made in consultation with BLM and Fish and Wildlife Service.

No threatened and endangered or sensitive plant species are known to occur on the PRLA.

Criterion 10: State-Listed Endangered Species

The State threatened and endangered species list of animals potentially affected by PRLA leasing conforms to the Federal listing.

After consultation with the Colorado Division of Wildlife, it was determined that no State-listed animal species, or their habitat, would be adversely affected by lease development.

No State-listed threatened, endangered, or sensitive plant species are known to occur on the PRLA.

Criterion 11: Bald and Golden Eagle Nests

No eagle nests occur on the PRLA.

Criterion 12: Bald and Golden Eagle Roost and Concentration Areas

A major bald eagle winter roost and concentration area exists on the White River, 5 miles wouth of the PRLA. After consultation with the Fish and Wildlife Service, it was determined that the bald eagle winter concentration area is removed from the tract to the extent that coal development would not prove detrimental to the wintering eagle population or their habitat.

Criterion 13: Falcon Cliff Nesting Sites

No suitable cliffs available for falcon nesting occur on the PRLA.

Criterion 14: Migratory Birds

No high priority areas were found.

Criterion 15: Resident Fish and Wildlife

After consultation with the Colorado Division of Wildlife, it was determined that no resident wildlife would incur significant long-term adverse impact. The area is therefore considered suitable for mining by underground methods.

Criterion 16: Flood Plains

No flood plains have been identified as unsuitable.

Criterion 17: Municipal Watersheds

No municipal watersheds have been identified within the potential coal lease area.

Criterion 18: National Resource Waters

To date, no water courses in the application area have been officially designated as National Resource Waters in completed water quality management plans. Because the areas under review have not officially been designated, they were considered suitable.

Criterion 19: Alluvial Valley Floors

There are no alluvial valley floors within the PRLA.

Criterion 20: State-Proposed Criteria

To date the State has not furnished any unsuitability criteria.

SUMMARY OF UNSUITABILITY ANALYSIS FROM WHITE RIVER RESOURCE AREA COAL MANAGEMENT FRAMEWORK PLAN AMENDMENT FOR COAL LEASES C-1545, C-28358, C-28359, AND 400 ACRES OF UNLEASED LAND

No areas with coal lease C-1545, C-28358, C-28359. and 600 acres of unleased land are considered unsuitable as a result of the application of unsuitability criteria 1, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13. 14. 16, 17, 18, 19, and 20.

Application of unsuitability criteria 2, 11, and 15 resulted in the following:

Criteria 2: Rights-of-Way and Easements

Lands and Realty.--The area of T. 1 N., R. 93 W., 6th P.M., sec. 3: SE¼NE¼, within right-of-way C-22713 (high voltage transmission line of Western Area Power Administration) is considered suitable for surface mining and facilities provided the parties involved in the right-of-way agree to mining or to having the right-of-way moved. In event that this agreement is not obtained, the area within Right-of-Way 22713 shall be considered unsuitable for surface mining or surface facilities. (Applicable to coal lease C-28359.)

Criteria 11: Bald and Golden Eagle Nests

T. 2 N., R. 93 W.

Section 19: SE¼SE¼

Section 30: S½NW¼NE¼SE¼
SW¼NE¼SE¼
SE¼NE¼SE¼
S½NE¼NW¼SE¼
SW¼NMW¼SE¼
SE¼NW¼SE¼
SW¼SE¼
SE¼SE¼

Section 31: N½NE¼

The above legal descriptions are unsuitable for surface mining and, with stipulation, suitable for subsurface mining (Criterion 11).

Stipulation:

Surface occupancy and seasonal use restrictions apply. Restrictions will be developed on a site-specific basis at mine-plan development stage.

Criteria 15: State Resident Fish and Wildlife

T. 2 N . R. 93 W.

Section 20: S½S½SE¼

Section 21: NE¼
S½SW¼NW¼
N½NW¼SW¼
S½S½SW¼
E½SE¼
N½NW¼SE¼
S½SW¼SE¼

Section 22: All

Section 29: N½NE¼

The above legal descriptions are unsuitable for surface mining and, with stipulation, suitable for subsurface mining (Criterion 15).

Stipulation:

No surface facilities or occupancy allowed except on a site-specific basis. Surface facilities and occupancy allowed will be determined jointly by the Dolorado Division of Wildlife and BLM at the mine-plan development stage.

* U.S. Government Printing Office 1982 580-585/391 Reg. 8